CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): **Graylon K. Williams et al.**			Docket No. **5702.00004**
Serial No. **09/664,130**	Filing Date **9/18/00**	Examiner **Edward A. Miller**	Group Art Unit **3641**

Invention: **GENERANTS CONTAINING SILICONE FUELS**

I hereby certify that the following correspondence:

Response to Advsory Action of 12/3/03 (7 pages); Petition fee (Check No. 18518); 7 sets of Exhibits; (Exhibit #1 - 14 pages); (Exhibit #2 - 8 pages); (Exhibit #3 - 28 pages); (Exhibit #4 - 2 pages); (Exhibit #5 - 4 pages); (Exhibit #6 - 17 pages); (Exhibit #7 - 5 pages); Postcard

(Identify type of correspondence)

is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10 in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on **12/5/03**
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IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

Group Art Unit 3641
Examiner Edward A. Miller

GRAYLON K. WILLIAMS, et al.
Serial No. 09/664,130

Filed September 18, 2000

For: GAS GENERANTS CONTAINING SILICONE FUELS/

PETITION UNDER 37 C.F.R. 1.182 FOR ENTRY OF REPLY BRIEF UNDER 37 C.F.R. 1.193(b)

December 5, 2003

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Responsive to the ADVISORY ACTION mailed on December 3, 2003, Applicants under 37 C.F.R. 1.~~182~~ 181 respectfully petition for entry of the Reply Brief twice previously filed under 37 C.F.R. 1.193(b), and state the following:

1. On April 16, 2003, Applicants finalized an Appeal Brief **(Exhibit 1)** relative to the above-captioned application. In the Appeal Brief, Applicants argued that one or more references taught away from the present invention relative to the potential formation of carbon monoxide.

2. On July 2, 2003, the Examiner mailed the Examiner's Answer **(Exhibit 2)** to the Appeal Brief earlier filed. In the Answer, the Examiner among other things argued ***for the first time*** that Applicants' contention of potential carbon monoxide formation as recited in the Appeal Brief lacked scientific foundation.

3. On September 2, 2003, Applicants ***timely*** filed a Reply Brief **(Exhibit 3)** pursuant to

37 C.F.R. 1.193(b). A copy of the postcard receipt is also included **(Exhibit 4)**. In the Reply Brief, Applicants among other things rebutted the Examiner's argument that the potential for carbon monoxide formation lacked scientific foundation.

In the Reply Brief, Applicants did not supply any new affidavits or any new "evidence" as characterized by the Examiner. Rather, Applicants simply provided ***known textual references*** labeled as Exhibits A, B, and C. Applicants had not earlier provided them in the Appeal Brief because of the well-known nature of the truth presented by the references; namely, that carbon monoxide may be formed within a broad spectrum of temperature regimes, and, that carbon monoxide and carbon dioxide ***exist in equilibrium*** across a broad temperature regime, for example. Because of the well-known nature of this fact, as shown in the references, Applicants simply did not see the necessity of earlier providing evidential support for a fact well-established in the scientific community.

Stated another way, Applicants presented these references not to fill in a gap because of a failure to earlier present affidavits or laboratory evidence, but rather to fully respond to the Examiner's argument ***first raised*** in the Examiner's Answer, an argument that simply could not be supported when viewed in light of knowledge well-known to one of ordinary skill in the art.

4. In a first Advisory Action **(Exhibit 5)** mailed on October 1, 2003, the Examiner refused to enter the Reply Brief timely filed on September 2, 2003. The reasons for non-entry were a) that the Reply Brief was not provided in triplicate, and b) that References A, B, and C constituted "evidence" that should not be included in the Reply Brief because justification under 37 C.F.R. 1.116 or 37 C.F.R. 1.195 had not been presented. Again, because the References were well-known textual references constituting what is well-known in the art, Applicants did not interpret the

References A-C to be within the scope of the new evidence, affidavits, or exhibits that are described by 37 C.F.R. 1.195. Applicants did not state why they were not earlier presented because their inclusion in the Reply Brief was simply responsive to the Examiner's Argument ***first raised*** in the Examiner's Answer ***immediately*** preceding the Reply Brief. This is apparent from review of the file history.

Stated another way, Applicants did not interpret the inclusion of well-known textual material to implicate sections 1.116 or 1.195 because those References A-C were not believed to be new evidentiary material as covered by 1.116 or 1.195, but were instead believed to be references that simply illustrated well-known scientific fact that contravened ***with certainty*** the Examiner's argument first presented in the Examiner's Answer.

With regard to the examiner's requirement that the Reply Brief be provided in triplicate, 37 C.F.R. 1.192(a) requires that an Appeal Brief be filed in triplicate. There does not appear to be a similar requirement for the Reply Brief. Instead, 37 C.F.R. 1.193(b) simply states that the Appellant may file ***a*** reply brief to an examiner's answer. Accordingly, Applicants did not originally file the Reply Brief in triplicate because the regulations do not appear to require the same.

Finally, with regard to a time for response, the Examiner indicated in his first Advisory Action that,

> "the time period for appellants ***to file their Reply Brief*** continues to run 2 months from July 2, 2003. ***This time period may be extended up to 5 months in accordance with 37 C.F.R. 1.136(a)***." (emphasis added) **See Exhibit 5, page 2, item 3.**

Although this is inconsistent with 37 C.F.R. 1.193(b) and 1.136(b), Applicants believed this to likely be within the Examiner's authority to permit an extension for

the period of response under 1.136(a) rather than 1.136(b).

5. On or about October 30-November 3, Applicants' representative Laurence Begin conducted several teleconferences with the supervisor of Examiner Miller, Mr. Michael Carone. The concerns described above were discussed. Specifically, the topics of discussion included:

(1) the References A-C being used to rebut an argument first raised by Examiner Miller in the Examiner's Answer and not before, and the fact that these References simply showed well-known scientific theory and were not therefore "new evidence", but were instead examples of well-known scientific understanding all published and available to those of ordinary skill;

(2) whether or not triplicate copies of the Reply Brief were required; and

(3) whether or not Applicants could rely on the extension of time as represented by the Examiner, or, stated another way, whether the Applicants could rely on the Examiner's authority that an extension of time was permissible under 37 C.F.R. 1.136(a) rather than 37 C.F.R. 1.136(b).

Applicants' representative Laurence Begin indicated his concern that if an extension was only available under 37 C.F.R. 1.136(b), then the appropriate course of action at that time would be to petition for entry of the Reply Brief, rather than file a revised Reply Brief. Mr. Begin understood Mr. Carone to indicate that if a statement under 37 C.F.R. 1.195 was included with a revised Reply Brief, and if the appropriate extension fee were included, the Reply Brief would be entered.

5. Accordingly, based on his discussions with Mr. Carone, rather than filing a petition

for entry of the Reply Brief, Mr. Begin filed a revised Reply Brief on November 3, 2003 including a statement under 37 C.F.R. 1.195 **(see Exhibit 6)** and including the fee for a two-month extension of time. This course of action was only adopted with what Mr. Begin understood to be Mr. Carone's endorsement.

7. Finally, in a second Advisory Action **(see Exhibit 7)** having a mailing date of December 3, 2003, Examiner Miller refused to enter the revised Reply Brief citing 37 C.F.R. 1.193(b) and 37 C.F.R. 1.136(b), and ***stating that the Reply Brief was unacceptable because it was filed after the expiration of the time for reply.*** This contravenes Examiner Miller's earlier representation that the Reply Brief would be entered if filed within five months after expiration of the two-month time frame and is patently unfair given Applicants' reasonable reliance on ***all*** of the examiner's representations in his first Advisory Action. Furthermore, this result also contravenes Mr. Begin's understanding of Mr. Carone's endorsement of filing the revised Reply Brief in the period of extension indicated by Mr. Miller.

For the reasons enumerated above, the examiner's reluctance to enter the Reply Brief denies the applicants a fair and full opportunity to respond to new arguments made in the Examiner's Answer and to fully prosecute the application. Applicants have submitted a Reply Brief that strongly supports their position on the merits. Non-entry of the Reply Brief would hamper the Applicants' ability to present a full case to the Board prior to the Oral Hearing. As shown in the exhibits, applicants have earnestly attempted to comply with all regulations and requirements as described in 37 C.F.R. and as indicated by Mr. Miller and Mr. Carone. The initial Reply Brief was timely filed within the two-month time frame. As stated above, one of the reasons given for non-entry was the failure to file the Reply Brief in triplicate. Applicants do not find regulatory support for the examiner's requirement. Furthermore, Applicants do not believe that Exhibits A-C fall within the scope of 37 C.F.R. 1.116 or 1.195 given that it is not "new evidence" such as affidavits or the like, but is instead old and well-known textual support for a rebuttal argument made responsive to a first occurrence of the examiner's argument in the Examiner's Answer. The

applicants did not provide Exhibits A-C in an attempt to correct a past oversight. These references were instead provided merely to reinforce the validity of Applicants' argument based on well-known scientific principles as implicitly presented in the Appeal Brief.

In sum, Applicants timely filed a Reply Brief **(see Exhibits 3 and 4)** they understood to be complete when filed. The examiner and the applicants differed on whether triplicate copies were required, and, whether Exhibits A-C of the Reply Brief was "new evidence", and therefore whether a statement under 37 C.F.R. 1.195 was required. Applicants do not believe that triplicate copies were required by 37 C.F.R. 1.193(b) and furthermore, do not believe that the Exhibits A-C qualify as "new evidence" or are otherwise within the scope of 37 C.F.R. 1.195. Nevertheless, even if the examiner is correct in either regard, it seems less than reasonable to deny the applicants a full opportunity to be heard on the merits for matters upon which reasonable minds could differ. It also seems less than reasonable that Examiner Miller would represent that additional periods of extension would be permissible under 37 C.F.R. 1.136(a) in his first Advisory Action of October 1, 2003 and then subsequently deny entry of the revised Reply Brief ***because of expiration of the period for response*** under 37 C.F.R. 1.193(b) and 1.136(b). Because the Reply Brief was at least substantially complete when initially filed, a more reasonable course and one more fair to the applicants would be to give the applicants an opportunity to address the technicality posed by Examiner Miller, or, afford the applicants an opportunity to correct an arguably defective Reply Brief. This course of action was in fact followed as per Mr. Carone's suggestion by submittal of the revised Reply Brief (in triplicate) on November 3, 2003 to the United States Patent and Trademark Office.

In view of the facts described above, Applicants respectfully petition for entry of the revised Reply Brief as submitted on November 3, 2003, and a determination that all regulatory requirements at issue have been satisfied by the Applicants. If necessary and in the interest of fairness, Applicants concurrently petition for waiver of any applicable rules given the facts described above. Applicants therefore respectfully petition for waiver of the rules including 37 C.F.R. 1.195 requiring a showing of good and sufficient reasons why Exhibits A-C of the Reply

Brief were not earlier included given that Applicants only included them to fully respond to arguments first made by the examiner in the Examiner's Answer. If necessary, Applicants also petition for waiver of 37 C.F.R. 1.193(b) requiring that any extensions of time be made under 37 C.F.R. 1.136(b) given that Examiner Miller stated that extensions under 37 C.F.R. 1.136(a) would be permissible. Finally, if necessary, Applicants petition for waiver of 37 C.F.R. 1.136(b) requiring that any extension of time made thereunder be applied for prior to expiration of the period of response, that is the two month time period for filing of the Reply Brief. If the Office of Petitions has any further questions, they are requested to call the undersigned at 248-364-2100.

A fee of $130.00 has been calculated in connection with this paper pursuant to 37 C.F.R. §§1.182 and 1.17(h). The Commissioner is authorized to charge any deficiencies or credit any overpayments to Deposit Account No. 04-1311. A duplicate copy of the first page of this transmittal is enclosed.

Respectfully submitted,

Date 12/5/03

By 

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EXHIBIT 1

IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

Group Art Unit 3988
Examiner Edward A. Miller

Graylon K. WILLIAMS, et al. **REVISED APPEAL BRIEF**

Serial No. 09/664,130

Filed September 18, 2000

For: GAS GENERANTS CONTAINING SILICONE FUELS/ April 16, 2003

Box AF
Assistant Commissioner of Patents
Washington, D.C. 20231

Sir:

This is an appeal from the final rejection of claims 1-13 and 16-18 set forth in the office action mailed September 6, 2002. Applicants appreciate the opportunity to revise the brief relative to the examiner's concerns in Paper No. 13. Responsive revisions consistent with the examiner's comments have been made below. Concurrently herewith, Applicants petition for a one-month extension of time for the period of response and include the appropriate fee.

(1) Real Party of Interest:

The real party of interest in this appeal is Automotive Systems Laboratory, Inc., a Michigan corporation, the owner of the subject application by assignment.

(2) Related Appeals and Interferences:

There are presently no other appeals and/or interferences known to appellant, appellant's legal representative, or assignee which will directly affect or be directly affected by the Board's decision in the pending appeal.

I hereby certify that this correspondence is being deposited with the U.S. Postal Service with sufficient postage as first class mail in an envelope addressed to: Box AF, Assistant Commissioner of Patents, Washington, D.C. 20231, on April 16, 2003

Name of person mailing: Laurence C. Begin Signature: Laurence C. Begin Date 4/16/03

(3) Status of Claims:

Claims 1-13 and 16-18 are pending and stand finally rejected in an Office Action dated September 6, 2002 (Paper #10). Claims 14 and 15 are pending but have been withdrawn from consideration.

(4) Status of Amendments:

No Amendment was filed After the Final Rejection.

(5) Summary of the Invention:

The present gas generant composition solves the problems of excess combustion temperatures and relatively higher inflator operating pressures, and meets toxicity requirements given its stated suitability for use within a vehicle occupant restraint system. Typically, the need to pressurize an associated combustion vessel during combustion requires a more robust inflator and therefore increases the manufacturing costs.

Accordingly, a gas generant composition is provided that exhibits an acceptable and sustained burn rate at ambient pressure while avoiding excessive combustion temperatures. Furthermore, gas generant compositions of the present invention exhibit a ductility or elasticity that inhibits fracture of the gas generant over time. A gas generant composition of the present invention contains silicone as a fuel; an oxidizer selected from the group including metal and nonmetal perchlorates such as potassium perchlorate, lithium perchlorate, and ammonium perchlorate; and, a coolant selected from the group including metal carbonates, metal bicarbonates, metal oxalates, and metal hydroxides.

Preferred coolants will preferably exhibit a greater negative heat of formation. As such, dissociation of the coolant upon combustion of the gas generant composition generally results in an endothermic combustion reaction thereby resulting in a cooler combustion temperature. Furthermore, when coolants such as strontium carbonate are employed, silicates such as strontium silicate are formed thereby forming an insulation about the propellant as it burns, thus conserving heat.

As claimed in claim 1, the present invention includes silicone as a fuel, an

oxidizer selected from the group consisting of metal and nonmetal perchlorates, and a coolant selected from the group consisting of alkali, alkaline earth, and transitional metal carbonates, bicarbonates, oxalates, and hydroxides. As detailed on page 6 and in Table 1 of the specification, compositions containing silicone and a perchlorate oxidizer exhibit rapid and sustained burn rates (at 3000 psi) greater than or equal to one inch per second. At ambient pressure these compositions exhibit burn rates at approximately 0.4 inches per second or greater and provide adequate amounts of gas. An inherent benefit of a reduced operating pressure, therefore, is that inflators associated with these compositions exhibit satisfactory burn rates and gas production while reducing the necessity of a robust inflator design. However, without the coolant, compositions containing silicone and a perchlorate oxidizer may exhibit relatively high temperatures. See examples 2 and 3 as compared to examples 17, 21 and 24 of Table 1. As explained below, the prior art cited simply does not teach or suggest the compositions of the present invention. Stated another way, the prior art does not describe or suggest compositions exhibiting the multiple benefits of improved combustion properties at ambient operating pressure, a relatively lower operating temperature, and adequate amounts of gas.

(6) Issues:

Did the Examiner err in finally rejecting claims 1-13 and 16-18 as being unpatentable over Grebert et al. in view of Plantif et al., Hamilton, Ochi et al., Taylor et al., and Hackett et al. under 35 U.S.C. §103(a)?

(7) Grouping of Claims:

Claims 1-13 and 16-18 stand together as being rejected for the same reasons.

(8) Argument:

The basic reference applied against claims 1-13 and 16-18, namely U.S. Patent No. 3,986,908 to Grebert et al. does not respond to the positive limitations of claims 1 and 16, and all claims dependent thereon. Grebert does describe compositions containing silicone rubber and perchlorate oxidizers, but

he indicates a concern about the toxicity of the gases. See column 1, lines 22-35:

> Moreover, the use of conventional composite propellants as gas generators in inflatable cushion protection devices for high speed vehicles, such as automobiles, cannot be considered because these propellants do not fulfil the condition that the gases they produce ***should be non-toxic***,...(emphasis added)

Also see column 2, lines 28-45 where Grebert advises one of ordinary skill in the art that:

> [T]he preferred binders are cellulose acetates, particularly cellulose triacetate, and silicone rubbers, particularly silicone rubbers with a carbon content less than 33%. The preferred proportion of cellulose triacetate is from 8 to 17.2% by weight, and that of silicone rubber is from 8 to 14.6% by weight. Below 8% by weight, the binder does not coat the grains of oxidizing agent perfectly. The upper limit for the proportion of binder is determined by the ***necessity of obtaining a carbon monoxide content of not more than about 500 PPM on combustion***....(emphasis added)

Note that Grebert reduces the percent weight range of silicone rubber as compared to triacetate, implicitly concluding greater carbon monoxide production when silicone rubber is used.

Also see column 2, lines 49-55:

> Many plasticizers may be employed, the preferred being tricresyl phosphate, diethyl phthalate and triacetin. The best results with respect to mechanical strength and toxicity of the gases produced, are obtained with triacetin which, for the same weight of plasticizer, introduces the ***least carbon into the composition***....(emphasis added)

It is therefore clear that Grebert is especially concerned about managing the total carbon content in the composition. In view of the above, the addition of a carbonate or oxalate coolant for example, as claimed in the present invention, would apparently contravene the purposes of Grebert's invention, for carbon would be added to the overall composition, thereby providing additional carbon for the production of carbon monoxide.

This notion is particularly supported in view of the following:

> The preferred combustion accelerator is aluminium which preferably has a specific surface area of from 3400 to 3800 cm^2 per cm^3. See column 2, lines 46-48.

and see column 4, lines 30-45:

> The maximum aluminium is determined by the rise in the reaction temperature due to the exothermic properties of aluminium and which, in turn, leads to an increase in the carbon monoxide content of the combustion gases as shown in the following table:

Proportion of Triacetate	CO at the neck of the pipe (PPM)			
	0%Al	2%Al	3%Al	4%Al
8		9	32.2	80
10		42	103	261
12	17	126	288	514
14	75	317	600	1020
16	210	690	1360	3450
18	700	1635		

Note that as shown in the table, even though aluminium is preferably used as a combustion accelerator, the use of aluminium always results in additional amounts of carbon monoxide. Also note that the table reflects the use of triacetate as a binder, not silicone. Recall that as described above, the use of silicone would result in even more amounts of carbon monoxide and therefore the percent range is reduced relative to that of triacetate. Accordingly, the percentage of silicone would have to be reduced in order to keep the carbon monoxide below 500 PPM as required by Grebert. If carbon-containing coolants (e.g. carbonates and oxalates) were added the percentage of silicone would theoretically, based on the table given above, have to be reduced even further. Note that Grebert indicates a percent level below 8% as unsatisfactory.

In a nutshell, therefore, Grebert essentially teaches away from adding any other carbon-containing composition that would increase the

propensity for the production of carbon monoxide. As set forth above by Grebert, one of ordinary skill in the art upon review of U.S. Patent No. 3,986,908 would conclude that the addition of a carbon-containing coolant would simply cut against Grebert's efforts to minimize carbon-monoxide production.

But Grebert also teaches away from the use of a coolant of the present invention by virtue of his use of an ***exothermic*** combustion accelerator. As explained by the applicants on page 3, lines 2-4 for example:

> Accordingly, dissociation of the coolant upon combustion of the gas generant composition ***results in an endothermic combustion reaction thereby resulting in a cooler combustion temperature.***,...(emphasis added)

As explained above, the combustion of the gas generant composition containing a combustion accelerator would result in higher temperatures due to the exothermic character of the combustion accelerator. Accordingly, one of ordinary skill in the art would not be motivated ***to increase*** the temperature of the combustion and concurrently ***decrease the temperature*** with the use of a carbon-containing coolant. Stated another way, the use of an endothermic coolant is counterintuitive to the stated reason for the use of a combustion accelerator, namely to increase (not decrease) the combustion temperature.

As detailed in paper No. 9, (the Request for Reconsideration filed on 12 August 2002), the other references cited do not cure the deficiencies of Grebert. In essence, they either teach away, or simply lack any motivation or suggestion to combine the references.

Plantif et al recognizes the benefit of forming compositions containing perchorate oxidizers and silicone resin. Plantif also recognizes the benefit of coolants, but **teaches away** from their use in solid propellants when the gases to be produced are non-toxic (as in occupant restraint systems). See column 1, lines 12-31. As such, Plantif incorporates outboard coolants as recognized by the examiner, but does not contemplate or suggest the use of a coolant integral to the

gas generant composition. When a reference teaches away from an invention, it is well founded that it cannot suggest the same.

Hamilton also **teaches away** from the present invention. At column 1, lines 45-50, Hamilton summarizes the invention:

> In accordance with the present invention, a combustible mixture of carbon, an oxidizer which does not contain hydrogen and, optionally, a coolant are mixed to form a combustible material which produces non-toxic gas rapidly, at relatively low temperature, and ***without the production of water vapor.*** (Emphasis added)

Silicone, as described in Formulas 1 and 2 of the present invention, for example, often contains an abundant amount of hydrogen. This contravenes Hamilton because of the propensity for compositions containing silicone to produce at least minimal amounts of water.

Ochi et al. does not suggest any fuel (or reducing agent) other than HDCA or hydrazodicarbonamide. The structure of HDCA is markedly different from silicone. Compare Formula 1 of Ochi with Formulas 1 and 2 of the present invention. The examiner's attention is also directed to Tables 2, 5, and 6 as found in Ochi. The "In-tank gas temperature (°C)" resulting from combustion of compositions described by Hamilton ranges from 152 to 407 °C. When viewed in light of Ochi's objects of the invention as described in column 2, lines 5-35 (e.g. low combustion temperature), one of ordinary skill in the art would not be motivated to replace the low heat generating HDCA with silicone. The use of silicone results in temperatures in excess of 2000°C as given in Table 1 on pages 6 and 7 of the specification. Therefore, Ochi et al. also **teaches away** from the present invention.

Although Taylor describes the use of perchlorates in compositions, the similarity ends there. Neither does Taylor offer any motivation or suggest formulation of the present compositions when viewed in light of Grebert. Taylor has as an object of the invention, production of an easily extrudable composition that is readily cured at room temperature, and mixed at low viscosity. See the

"Summary of the Invention". These objects simply differ from the benefits characterized in the present invention. As such, one of ordinary skill in the art would not be motivated to consider Taylor when formulating the present compositions. A prima facie case of obviousness cannot be supported without the requisite showing of a suggestion or motivation to combine the references. Again, Taylor falls short in this regard.

Finally, in the same way, Hackett fails to cure the deficiencies of the references cited. Although Hackett recognizes the usefulness of silicone and inorganic perchlorates, he does not offer any motivation or suggestion to combine silicone with a perchlorate oxidizer and a coolant.

In sum, none of the references when taken alone or when taken together suggest or describe the present invention. Stated another way, for the reasons given, a prima facie case of obviousness cannot be supported by references that teach away from the present invention, nor can it be supported without the requisite showing of a motivation to combine the references.

The examiner is advised that if the proposed modification or combination of the prior art would change the principle of operation of the prior art invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). Adding carbon-containing coolants to the compositions of Grebert would certainly change the principle of operation given that an endothermic reaction would occur rather than the preferred exothermic reaction as described above.

The examiner is further advised that it is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). Certainly, Grebert teaches away from adding any additional component (other than those described) that would contribute to any increase in carbon monoxide combustion products. The table in column 4 illustrates the ease of carbon monoxide formation, particularly at higher temperatures and under pressurized conditions. Grebert's admonitions against increasing the carbon amount dissuade rather than

persuade one of ordinary skill to proceed by adding more carbon.

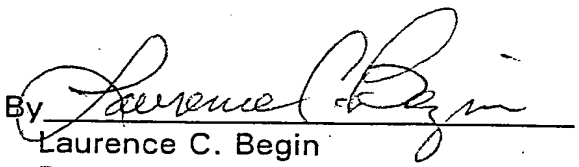
Finally, the examiner is yet further advised that proceeding contrary to accepted wisdom in the art is evidence of nonobviousness. *In re Hedges*, 783 F.2d 1038, 228 USPQ 685 (Fed. Cir. 1986). Clearly, addition of carbon-containing coolants despite Grebert's admonitions against it cuts against the prevailing wisdom at the time of the present invention.

(9) Conclusion:

For the above-stated reasons, the examiner has simply not met the burden of substantiating a prima facie case of obviousness relative to claims 1-13 and 16-18. Most importantly, Grebert teaches away from adding an endothermic carbon-containing coolant. Similarly, the other references teach away or fail to suggest a combination of the references for the reasons stated. The requisite suggestion or motivation to combine the references is therefore lacking. Accordingly, reversal of the Examiner's rejection of claims 1-13 and 16-18 under 35 U.S.C. §103, and issuance of the present application is courteously solicited.

Applicant has calculated a fee of $110.00 for a one-month extension of time in connection with this revised brief. Our check is enclosed in that amount. The Commissioner is hereby authorized to charge any additional fees incident to the filing of this communication to Deposit Account No. 04-1131. A duplicate copy of the front page of this document is enclosed.

Respectfully submitted,

By 
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(10) Appendix – Claims 1-13 and 16-18:

1. A gas generant composition comprising:
silicone as a fuel;
an oxidizer selected from the group consisting of metal and nonmetal perchlorates; and
a coolant selected from the group consisting of alkali, alkaline earth, and transitional metal carbonates, bicarbonates, oxalates, and hydroxides.

2. The gas generant composition of claim 1 further comprising:
a secondary oxidizer selected from the group consisting of metal and nonmetal nitrates.

3. The gas generant composition of claim 1 wherein said oxidizer is selected from the group consisting of potassium perchlorate, ammonium perchlorate, and lithium perchlorate.

4. The gas generant composition of claim 1 wherein said composition comprises:
silicone;
potassium perchlorate; and
strontium carbonate.

5. The gas generant composition of claim 1 wherein said composition comprises:
silicone;
potassium perchlorate; and
strontium oxalate.

6. The gas generant composition of claim 1 wherein said composition

comprises:

silicone;

potassium perchlorate; and

calcium oxalate.

7. The gas generant composition of claim 1 wherein said composition comprises:

silicone;

potassium perchlorate; and

calcium carbonate.

8. The gas generant composition of claim 1 wherein said composition comprises:

silicone;

potassium perchlorate; and

magnesium hydroxide.

9. The gas generant composition of claim 1 wherein said composition comprises:

silicone;

potassium perchlorate; and

magnesium carbonate.

10. The gas generant composition of claim 1 wherein said composition comprises:

silicone;

lithium perchlorate; and

a coolant selected from the group consisting of strontium carbonate, calcium carbonate, strontium oxalate, magnesium carbonate, magnesium hydroxide, and potassium carbonate.

11. A gas generant composition comprising:
silicone at 10-25%;
a primary oxidizer selected from the group consisting of metal and nonmetal perchlorates at 30-85%; and
a coolant selected from the group consisting of alkali, alkaline earth, and transitional metal carbonates, oxalates, bicarbonates, and hydroxides at 1-30%, said percentages stated by weight of said gas generant composition.

12. The gas generant composition of claim 11 further comprising:
at least one secondary oxidizer selected from the group consisting of nonmetal, alkali metal, alkaline earth metal, and transitional metal chlorates, nitrates, nitrites, and oxides at 30-50% by weight of said gas generant composition.

13. The gas generant composition of claim 12 wherein said at least one secondary oxidizer is selected from the group consisting of phase stabilized ammonium nitrate, ammonium nitrate, strontium nitrate, and potassium nitrate.

16. A gas generant composition comprising:
silicone at 10-25%;
potassium perchlorate at 30-85%; and
a coolant selected from the group consisting of alkali metal, alkaline earth metal, and transitional metal carbonates, oxalates, and hydroxides at 1-30%, said percentages stated by weight of said gas generant composition.

17. The gas generant composition of claim 16 comprising:
silicone at 10-25%;

potassium perchlorate at 30-85%; and

strontium carbonate at 1-30%, said percentages stated by weight of said gas generant composition.

18. The gas generant composition of claim 17 comprising:

silicone at 20%;

potassium perchlorate at 60%; and

strontium carbonate at 20%, said percentages stated by weight of said gas generant composition.

EXHIBIT 2

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 15

Application Number: 09/664,130
Filing Date: September 18, 2000
Appellant(s): WILLIAMS ET AL.

Laurence C. Begin
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 21, 2003.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's statement that the claims stand together is not the language of the rule. The claims stand or fall together in view of appellant's statement and since there are no arguments for the separate patentability of any dependent claim by number; all the claims are argued together. Only on Brief page 3, penultimate line, are independent claims 1 and 16 mentioned separately.

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

3,964,256	Plantif et al.	6-1976
3,986,908	Grebert et al.	10-1976

4,309,229	Hamilton	1-1982
5,538,568	Taylor et al.	7/1996
5,656,793	Ochi et al.	8/1997

(10) Grounds of Rejection

The following ground of rejection is applicable to the appealed claims:

Claims 1-13 and 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Grebert et al. in view of Plantif et al. and Hamilton, and further in view of Ochi et al., Taylor et al.

Grebert et al. teach air bag compositions, where the main oxidizer is, for example, potassium perchlorate, and which composition may include additives and a binder of silicone rubber. See col. 1, lines 5-12, col. 2, lines 9-30, and col. 3, lines 1-8 for the "Composition B" with ranges of ingredients including silicone resin binder-fuel, perchlorate oxidizer and minor amounts of additives, and lines 50-58 for a specific example. Although coolants are not taught, Plantif et al. teach that the gases from such compositions may be hotter than desired, and suggest the use of outboard coolants, which may include carbonates, among others. Both of said patents are assigned to SNPE, and deal with the same problems - those of providing air bag gas generators and compositions therefore. Hamilton further teaches the use of coolants in air bag compositions with a perchlorate main oxidizer. In Hamilton, the Figure shows graphically that the coolant is a known optional ingredient, and that it may optionally be mixed with the gas generator composition, or it may be in the gas stream following gas generation, e.g., it may be outboard to follow the gas generation. This is further taught at col. 1, lines 37-42, which shows one aspect of the known problems with excess heat in air bag safety restraint devices. In col. 2, lines 12-15, oxidizers with the problem are metal perchlorates, e.g, potassium. Note also col. 2, lines 25-30, where the coolant may be decomposed within the gas generator within the gas generating mixture, or subsequently, to decompose

endothermically and cool the hot gas afterwards. Thus, the choice of adding the coolant to the initially gas generator composition is a known option to one of ordinary skill in the art. Plantif et al. show the problem is known with the specific silicone/perchlorate gas generating composition, and thus it would have been clearly obvious to add these well known coolants for the expected result. Variation of the specific type and amount of coolant, as well an other notoriously well known ingredients, for example, within the parameters taught, to obtain a suitable cooling result, would have been obvious to the person of ordinary skill in the subject art. It is well settled that optimizing a result effective variable is well within the expected ability of a person or ordinary skill in the subject art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980), *In re Aller*, 220 F.2d 454, 105 USPQ 233 (CCPA 1955). Since the claims stand or fall together, Taylor et al. and Ochi et al. are primarily supplemental, further teaching similar broad compositions and certain known ingredients, as well as further showing art teachings on variation of parameters.

(11) Response to Argument

Applicants' arguments are essentially that the references cannot be combined, whereby the combination is improper, that the references teach away from the combination, and that the applicants' compositions produce results not shown by the prior art.

It is respectfully pointed out that it is the teachings of the prior art that are combined for what they teach, not the prior art per se. The modifications are those of result effective parameters as set forth in the above mentioned citations. Arguments of other ingredients are not well taken, since the claims are all of the "comprising" scope, and thus do not exclude any such ingredients. That is to say, that applicants' claims are equally subject to the deficiencies that applicants point out for the references, as they permit the inclusion of the ingredients of the prior art, generally.

As to the argument at the top of Brief page 4, Grebert et al. does teach that the gases should be non-toxic. This is as it should be, and as applicants and, in fact, all practitioners in the art desire, that their customers, e.g., car occupants not be subject to toxic gases. Applicants argue about the amount of silicone binder being less than the case when cellulose acetate is the binder. As to carbonate coolant not being desirable in Grebert et al., due to carbon is not persuasive. Plantif et al. teach the use of various [alkali metal and alkaline earth metal] carbonate, oxalate, and bicarbonate coolants at col. 3, lines 23-26. In Hamilton, the coolant is preferably a carbonate, col. 2, lines 26-32. It must be observed that the carbon in a metal carbonate decomposes to form metal oxide and carbon dioxide. In other words, appellants' objection to adding carbon lacks scientific foundation, as the carbon of the coolant is already oxidized, or mostly so in the case of oxalate. Further, Plantif et al. teach that the SNPE silicone gas generating composition may generate excess oxygen at col. 2, lines 23-27. The problem that Grebert et al. discusses is, obviously a translation difficulty from the French, is not any additive that is carbon containing, but an additive that is contained in the composition and is elemental carbon. This is taught to provide smoother burning at col. 5, lines 1-6. Manifestly, when a carbonate is used as the coolant, the carbon is already oxidizer, and the problem and objection raised by appellants is nonexistent. As to small amounts of such ingredients, aluminium fuel and carbon combustion catalyst, there is no limitation in applicants broad, "comprising" scope claims to preclude such in any event. Any difficulty in this regard, is identically experienced by appellants. In an nutshell, then, Grebert et al. does not teach away from the combination, while Plantif et al. teach that the identical SNPE silicone binder, perchlorate oxidizer gas generating compositions for air bags, may optionally be cooled via endothermic cooling.

Considering Ochi et al., this supplemental reference further relates to a number of features and aspects of the claims, the arguments and the prior art. In the first instant, appellants object to

the major amount of HDCA in Ochi et al. While it is true that a major amount of such fuel is used therein, the fundamental meaning of the appellants' scope term, "comprising" is that additional ingredients may be added even in major amounts. From MPEP 2111.03, the transitional term "comprising", which is synonymous with "including," "containing," or "characterized by," is inclusive or open-ended and does not exclude additional, unrecited elements or method steps. See, e.g., *Genentech, Inc. v. Chiron Corp.*, 112 F.3d 495, 501, 42 USPQ2d 1608, 1613 (Fed. Cir. 1997); *Ex parte Davis*, 80 USPQ 448, 450 (Bd. App. 1948) ("comprising" leaves "the claim open for the inclusion of unspecified ingredients even in major amounts"). Thus, appellants' claims are subject to containing such ingredients and this does not distinguish over Ochi et al. Further, Ochi et al. teach at col. 5, lines 18-40, various facts about coolants. These are not opinions, they are facts. Coolants cool endothermically; that is a matter of plain chemistry. The motivation to cool the SNPE composition comes from SNPE, Pantif et al., not from Ochi et al. However, coolants are a notoriously well known variable that one of ordinary skill in the art may apply as desired. Among the variables are the metals and construction of the gas generating apparatus, as well as the presence or absence and the length of ducts, and variation in the materials of the air bag itself. All these relate to different degrees to which cooling may, or may not be desired, all as is notoriously well known to one of ordinary skill in the art. Further, although in some instances as in Hamilton, water vapor may not be desired, this is also an art recognized choice to the ordinarily skilled artisan. Also note, as to Ochi et al., col. 5, lines 42-52, there is a clear teaching that for that composition, one should use at least 3% up to 30% by weight of the coolant to provide suitable effectiveness. Looking to appellants' claim 1, one notes that there is no limitation on the amount of coolant. Even 0.5% coolant is within the limits of the instant claims.

Thus, for appellant to urge that the prior art compositions will have temperatures that are too high, as on page 7 of the instant Brief, in excess of 2000 degrees C, is not well taken. There is single no magic elixir or bullet that applies to all situations. There is no limitation in representative broad claim 1, e.g., to require any specific temperature be obtained, either via specifying in detail the amounts and specific detailed ingredients that are to be used, or by any functional language of any specific result, or by even the use of scope terminology that is less broad than "comprising", whereby certain results arguably might be required in the broad claims. Simply, it si submitted that appellants' claims do not define over the prior art teachings. "[C]laims are unpatentable when they are so broad as to read on obvious subject matter even though they likewise read on non-obvious subject matter." *In re Mraz*, 173 USPQ 25 (CCPA 1972).

For the above reasons, it is respectfully submitted that the rejection should be sustained.

Respectfully submitted,

EDWARD A. MILLER
PRIMARY EXAMINER

Edward Miller
June 30, 2003

Conferees
MC, AF

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EXHIBIT 3

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Graylon K. Williams, et al			Docket No. 5702-00004
Serial No. 09/664,130	Filing Date September 18, 2000	Examiner Edward A. Miller	Group Art Unit 3641

Invention:

GAS GENERANTS CONTAINING SILICONE FUELS

I hereby certify that the following correspondence:

Reply Brief 23 PAGES

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IN THE UNITED STATES PATENT
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Group Art Unit 3641
Examiner Edward A. Miller

Graylon K. WILLIAMS, et al.

REPLY BRIEF

Serial No. 09/664,130

Filed September 18, 2000

For: GAS GENERANTS CONTAINING SILICONE FUELS/

September 2, 2003

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Sir:

Claims 1-13 and 16-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Grebert et al. (3,986,908) in view of Plantif et al. (3,964,256), Hamilton (4,309,229), Ochi et al. (5,656,793), and Taylor et al. (5,538,568). Pursuant to 37 C.F.R. § 1.193(b)(1), Applicants now file a reply brief in response to the Examiner's Answer mailed July 2, 2003.

Grebert et al. teaches compositions containing metal and nonmetal perchlorates and silicone rubbers as organic binders. Grebert does not teach or suggest the use of coolants as presently claimed. Furthermore, as explained in the appeal brief (incorporated herein by reference), Grebert actually teaches away from the addition of other carbon-containing compounds.

Plantif et al recognizes the benefit of forming compositions containing perchlorate oxidizers and silicone resin. Plantif also recognizes the benefit of coolants, but only as coolant stages or phases separate from the combustion stage. Also note that Plantif describes the use of the coolants at temperatures well below the combustion temperature. The second coolant stage is affected by combustion gas contact with a solid particulate coolant comprising a compound which decomposes at a temperature below 200°C to produce a gas. Suitable compounds include alkali metal or alkaline earth metal carbonates, oxalates, or

bicarbonates. See column 3, lines 20-35. As such, Plantif incorporates outboard coolants as recognized by the Examiner, but does not contemplate or suggest the use of a coolant integral to the gas generant composition that is then combusted at much higher temperatures. Accordingly, even though cooling the combustion gases is recognized as a problem, there simply is no suggestion by Plantif to integrate the coolant into the gas generant composition to accomplish cooling of the combustion gases. Therefore, when reviewing Plantif one of ordinary skill in the art would not be motivated to completely change the invention of Plantif to add the coolants into the gas generant composition rather than cool in stages subsequent to the combustion stage.

Hamilton teaches away from the present invention. At column 1, lines 45-50, Hamilton summarizes the invention:

> In accordance with the present invention, a combustible mixture of carbon, an oxidizer which does not contain hydrogen and, optionally, a coolant are mixed to form a combustible material which produces non-toxic gas rapidly, at relatively low temperature, and ***without the production of water vapor.*** (Emphasis added)

Silicone, as described in Formulas 1 and 2 of the present invention, for example, often contains an abundant amount of hydrogen. This contravenes Hamilton because of the propensity for compositions containing silicone to produce at least minimal amounts of water. In fact, **Grebert** at column 5, lines 26-40, describes the same. Accordingly, when a reference teaches away from an invention it cannot suggest the same. Stated another way, one of ordinary skill in the art would not be motivated to include silicone in a gas generant composition in light of Hamilton because Hamilton specifically teaches against compositions that result in the formation of water vapor.

Ochi et al. does not suggest any fuel (or reducing agent) other than HDCA or hydrazodicarbonamide. The structure of HDCA is markedly different from silicone. Hence Ochi does not suggest the use of silicone by virtue of the use of HDCA. Compare Formula 1 of Ochi with Formulas 1 and 2 of the present invention. The examiner's attention is also directed to Tables 2, 5, and 6 as found

in Ochi. The "In-tank gas temperature (°C)" resulting from combustion of compositions described by Ochi ranges from 152 to 407 °C. When viewed in light of Ochi's objects of the invention as described in column 2, lines 5-35 (e.g. low combustion temperature), one of ordinary skill in the art would not be motivated to replace the low heat generating HDCA with silicone. Nor would one of ordinary skill in the art be motivated to add silicone to the compositions of Ochi. Adding silicone would increase the temperature in contravention of the stated purpose of maintaining low temperatures. The use of silicone results in temperatures in excess of 2000°C as given in Table 1 on pages 6 and 7 of the specification. Therefore, Ochi et al. also **teaches away** from the present invention.

Although **Taylor** describes the use of perchlorates in compositions, the similarity ends there. As with the other cited references, Taylor does not offer any motivation or suggest formulation of the present compositions when viewed in light of Grebert. Taylor has as an object of the invention production of an easily extrudable composition that is readily cured at room temperature, and mixed at low viscosity. See the "Summary of the Invention". These objects simply differ from the benefits characterized in the present invention. As such, one of ordinary skill in the art would not be motivated to consider Taylor when formulating the present compositions. A prima facie case of obviousness cannot be supported without the requisite showing of a suggestion or motivation to combine the references. Again, as with the other references mentioned above, Taylor falls short in this regard.

In view of the above, Applicants note that it is improper to combine references where the references teach away from their combination. ***In re Grasselli***, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983) (The claimed catalyst which contained both iron and an alkali metal was not suggested by the combination of a reference which taught the interchangeability of antimony and alkali metal with the same beneficial result, combined with a reference excluding antimony from, and adding iron to, a catalyst.)

Response to Examiner's Arguments

In addition to the comments above, Applicants note the following relative to the Examiner's response to the Applicants' arguments presented in the appeal brief.

To begin with, the Examiner throughout refers to the variation of the specific type and amount of coolant as well as "**other notoriously well known** ingredients, for example, within the parameters taught, to obtain a suitable cooling result, would have been obvious to the person of ordinary skill in the art." See page 4, lines 5-6 of the Examiner's Response. In the same way, the Examiner again refers to coolants as "a **notoriously well known** variable that one of ordinary skill in the art may apply as desired". See page 6, lines 12-13 of the Examiner's Response. Other occurrences of the same or similar language are also noted. For example, on page 6, lines16-17, "**all as is notoriously well known to one of ordinary skill in the art.**"

The Examiner is respectfully advised that, "a statement that modifications of the prior art to meet the claimed invention '*would have been well within the ordinary skill of the art at the time the invention was made*' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teaching of the references." *Ex parte Levengood* 28 USPQ 2d 1300 (Bd. Pat. App. & Inter. 1993) See also *In re Kotzab* 217 F. 3d 1365, 1371, 55 USPQ 2d 1313, 1318 (Fed. Cir. 2000)

Furthermore, the Examiner is also advised that, "the question under 35 U.S.C. § 103 is not whether the **differences** [between the claimed invention and the prior art] would have been obvious" but "whether the claimed invention ***as a whole*** would have been obvious." *Stratoflex, Inc. v. Aeroquip Corp.,* 713 F.2d 1530, 1537, 218 USPQ 871, 877 (Fed. Cir. 1983) Accordingly, Applicants

respectfully note that the Examiner's emphasis on addition and variation of the coolant is misplaced. Rather, proper emphasis is placed on the compositions as a whole and how the references taken as a whole suggest to one of ordinary skill in the art their respective combination to form the compositions as claimed in the present application.

In the same way, see page 6, lines 17-18 of the Examiner's Response, "Further, although in some instances as in Hamilton, water vapor may not be desired, this is also **an art recognized choice to the ordinarily skilled artisan.**" The case law cited above is also pertinent here. Furthermore, the Examiner fails to appreciate that Hamilton must be viewed *as a whole* as should any other reference when applied under 35 U.S.C. 103. When viewed as a whole, it becomes apparent that Hamilton would not lead one of ordinary skill to combine the teachings of Hamilton with Grebert, for as discussed herein and in the Appeal Brief, each cited reference explicitly and/or implicitly teaches away from the combination with the other. The Examiner states on page 4, lines 16-17 that "it is respectfully pointed out that it is the teachings of the prior art that are combined for what they teach, not the prior art per se." Applicants respectfully point out that it is the prior art, not the individual teachings, that provide the basis for the rejection under 35 U.S.C. 103. Accordingly, the Examiner is advised that the prior art references must be considered in their entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.,* 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied,* 469 U.S. 851 (1984)

Accordingly, Applicants respectfully maintain that when the references are considered in their entirety rather than as individual teachings in the art as apparently urged by the Examiner, the impropriety of combining the references becomes apparent for the reasons stated by the Applicants in the Appeal Brief and throughout this response. Furthermore, Applicants maintain that the compositions incorporating coolants as claimed do not represent **"notoriously well known"** variables or constituents known for their use in silicone based compositions, or in

gas generators and combusted therein. The cited references certainly would not lead to that conclusion. Further references are still requested. Applicants would direct the Examiner's attention to the arguments based on insufficient motivation to combine the cited references and also on how the various references actually teach away from their respective combination, particularly Grebert et al.

As to the arguments presented regarding the **"comprising"** scope, any distinctions made relative to the compositions described in the various references are not made to suggest what is not included in the present claims, but rather to emphasize what is not taught or motivated in the respective reference. Applicants appreciate the Examiner's remarks relative to the "comprising" scope in the claims and understand the term to be broad-based relative to the scope. Applicants also understand the term to mean that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim. *Moleculon Research Corp. v. CBS, Inc.*, 793 F.2d 1261, 229 USPQ 805 (Fed. Cir. 1986); *In re Baxter,* 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981)

Grebert et al. – Insufficient Motivation to Combine

As to the argument at the top of the Examiner's Response on page 5, Grebert et al. does teach that the gases should be non-toxic. Grebert also teaches that the compositions described must exhibit enhanced mechanical properties or mechanical strength. Accordingly, Grebert's compositions are directed at propellant compositions that have good mechanical strength and that yield combustion gases which are substantially free of toxic gases and which are, therefore, suitable for use as gas generators for inflatable cushion protection devices. See Grebert at column 1, lines 22- 35. As recognized by the Examiner, Applicants agree that non-toxicity is of course a concern with all gas generants involving human exposure. Nevertheless, in contradistinction to Grebert et al., the problems addressed by the present invention are centered about providing a gas generant composition having a sustained burn at ambient pressure while exhibiting

relatively reduced temperatures. See the Background of the Invention and see Table 1 and the Examples in the present application. Because Grebert et al. describes a different purpose for different compositions, Applicants maintain that one of ordinary skill in the art would not be motivated to combine Grebert et al. with Plantif, Hamilton, Taylor, or Ochi, because as explained above, the purposes for Grebert depart from the purposes of the present invention. Stated another way, Applicants are primarily concerned with sustained combustion at ambient pressures with relatively lower temperatures. On the other hand, Grebert is primarily concerned with non-toxicity and higher mechanical strength.

In support thereof, Applicants respectfully note that, "there are three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every element of the claimed invention, however, without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.) The level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) Applicants note that the Examiner has not shown the requisite motivation or suggestion to combine Grebert et al. with the other cited references as required to support a *prima facie* case of obviousness.

Grebert et al. – Teaching Away

With regard to **Grebert et al.** teaching away from combination with any other carbon-containing constituents, Applicants reiterate the discussion found in the Appeal Brief, herein incorporated by reference. Furthermore, Applicants acknowledge the Examiner's argument that the carbon in a metal carbonate decomposes to form metal oxide and carbon dioxide. The Examiner further states that appellants' objection to adding carbon lacks scientific foundation as the

carbon of the coolant is already oxidized, or mostly so in the case of oxalate. Responsive thereto, Applicants respectfully maintain that it is well known in the art that carbon dioxide and carbon monoxide exist in equilibrium across a broad spectrum of pressures and temperatures. As such, addition of a coolant that decomposes to carbon dioxide (among other things) and would result in increased amounts of carbon monoxide in the combustion products. In support thereof, Applicants direct the Examiner's attention to **Exhibits A, B, and C.**

Exhibit A is a copy of an excerpt from *INORGANIC REACTIONS AND STRUCTURE*, Edwin S. Gould (1955, 1962) Holt, Rinehart and Winston, Inc. As shown on page 107, the decomposition of various alkaline earth carbonates occurs at different respective temperatures, or, the decomposition temperature of a carbonate differs with the alkaline earth metal (or metal) attached thereto.

Exhibit B is a copy of an excerpt from *Chemistry of the Elements*, N.N. Greenwood and A. Earnshaw (1984) Pergamon Press Ltd. As described in the highlighted portions originally taken from the *J. Inorg. Nucl. Chem.* 1769-71 (1981),

> "Very recently it has been shown that, at all pressures, there is a fairly wide range of temperatures in which CO_2 dissociates directly into CO and O_2 without precipitation of carbon.
>
> $$CO_2 \longleftrightarrow CO + \tfrac{1}{2}O_2$$ "

As shown, CO and CO_2 exist in equilibrium in a broad variety of pressure/temperature permutations.

Exhibit C is a copy of an excerpt from *J. Iron Steel Inst.* , F.D. Richardson and J.H.E. Jeffes 160, 261 (1948). Note that,

> "The equilibrium concentration of CO is 10% at 550°C and 99% at 1000°C..."

As shown, CO exists in equilibrium in greater percentages at higher temperatures.

It can therefore be concluded that at the temperatures indicated in Table

1, well above 1000°C, equilibrium conditions at the temperatures indicated would favor the formation of carbon monoxide. Accordingly, it can be concluded that the addition of metal carbonates and/or oxalates that result in carbon dioxide also result in a certain equilibrium concentration of carbon monoxide depending on the attendant temperature and pressure.

As such, the Examiner's assertion that the Appellants' position (*that the addition of a coolant such as a carbonate or oxalate adds carbon monoxide to the combustion gases*) is scientifically unfounded is respectfully traversed, especially in view of the textual references provided. Accordingly, Applicants again maintain that **Grebert et al.** teaches away from adding compounds or constituents that would increase the carbon monoxide because of the equilibrium conditions shown.

As to other arguments presented by the Examiner, Applicants note the following:

1. Contrary to the Examiner's assertion, Plantif et al. does not teach that the SNPE silicone gas generating composition may generate excess oxygen at column 2, lines 23-27. For the sake of argument only, even if the Examiner had shown this teaching to be the case, and even if the suggestion to combine Plantif with Grebert had been shown, Grebert describes the addition of aluminum. It is well known that aluminum scavenges the available oxygen to form aluminates thereby reducing the availability of oxygen for complete combustion of carbon monoxide. Again, this is illustrated in the table found in Grebert in column 4, lines 37-45.

2. The Examiner asserts that *"the problem Grebert et al. discusses is, obviously a translation difficulty from the French, is not any additive that is carbon containing, but an additive that is contained in the composition and is elemental carbon."* The Examiner's attention

is directed to Grebert et al., **column 4 line 14-column 5 line 15.** In contrast to what the Examiner urges, note that Grebert teaches that the addition of a binder should be reduced to reduce the production of carbon monoxide. He does not focus on elemental carbon but on carbon-containing binders (e.g. silicone). Applicants note that this same admonition would be applicable to any carbon-containing compound likely to produce carbon monoxide. The notion that this is a translational error would require that the same translational difficulty occur throughout the reference. Applicants still do not understand how the Examiner concludes that the problem is limited to elemental carbon. It plainly is not, **as taught by Grebert et al.**

3. The Examiner alludes to the breadth of the present claims with regard to the small amounts of aluminum fuel and carbon combustion catalysts. Applicants respectfully maintain that the proper focus is placed on the motivation of one of ordinary skill in the art to combine the cited references. It is only placed on the claims with regard to the essential limitations described therein. It is unclear why the Examiner focuses on the breadth of the claims instead of on the motivation of one of ordinary skill in the art to combine the references to form a prima facie case of obviousness. The Examiner has not shown why one of ordinary skill in the art would combine the references to formulate the essential elements of the claims as presently given. In essence, a prima facie case of obviousness is not predicated on the breadth of the claims and what they might include. Rather, a prima facie case of obviousness is supported by references ***properly combined*** that teach or describe all of the essential limitations of the claims. Accordingly, Applicants continue to maintain that for the reasons stated, a prima facie case of obviousness is simply not supported.

4. Applicants note the Examiner's instruction relative to Ochi and various facts about coolants: *"These are not opinion, they are facts. Coolants cool endothermically; that is a matter of plain chemistry."* Applicants agree. See page 2, lines 23-26 of the Appeal Brief, for example. Also, the Examiner states, *"Among the variables are the metals and construction of the gas generating apparatus, as well as the presence or absence and the length of ducts, and variation in the materials of the air bag itself."* Applicants respectfully note that these "variables" are not implicated in the claims. Rather, unique compositions incorporating a coolant are claimed by the Applicants. These are not notoriously well known or Plantif et al, for example, would certainly have alluded to their use within a composition rather than to the use of outboard coolants as taught therein.

5. With regard to Ochi et al., Applicants note that Ochi describes the use of coolants, but not within compositions containing silicone and perchlorate oxidizers. In fact, none of the references describe coolants used within a composition containing silicone and a perchlorate oxidizer. Furthermore, because of different purposes or because of teaching away, the Examiner has not shown any motivation to combine the references. The Examiner is reminded that, "a statement that modifications of the prior art to meet the claimed invention '*would have been well within the ordinary skill of the art at the time the invention was made*' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teaching of the references." *Ex parte Levengood* 28 USPQ 2d 1300 (Bd. Pat. App. & Inter. 1993) See also *In re Kotzab* 217 F. 3d 1365, 1371, 55 USPQ 2d 1313, 1318 (Fed. Cir. 2000)

Therefore, since none of the prior art of record teaches Applicants' claimed invention, nor provides any reason or motivation to modify the prior art to solve the specific problems for which Applicants were concerned, Applicants' position is that the Examiner has improperly relied upon Applicants' own teachings to support the grounds of rejection. See *In re Regel,* 526 F. 2d 1399, 1403 n.6, 188 USPQ 136, 139 n. 6 (CCPA 1975) ("there must be some logical reason apparent from positive, concrete evidence of record which justifies a combination of primary and secondary references") (citing *In re Stemniski*, 444 F.2d 581, 170 USPQ 343 (CCPA 1971)); *In re Geiger*, 815 F.2d 686, 688 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) (obviousness cannot be established by combining pieces of prior art absent some "teaching, suggestion, or incentive supporting the combination"); *In re Cho*, 813 F.2d 378, 382, 1 USPQ2d 1662, 1664 (Fed. Cir. 1987) (discussing the Board's holding that "the artisan would have been motivated" to combine the references); *In re Deminski*, 796 F.2d 436, 443, 230 USPQ 313, 316 (Fed. Cir. 1986) (impropriety of hindsight reconstruction); and *In re Donohue*, 766 F.2d 531, 534, 226 USPQ 619, 622 (Fed. Cir. 1985) (referring to the "suggestion or motivation to combine teachings" in rejections for obviousness) (citing *In re Samour,* 571 F.2d 559, 563, 197 USPQ 1, 4-5 (CCPA 1978). As such, the Examiner has failed to properly set forth a prima facie case of obviousness.

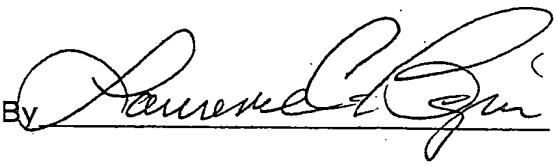
In sum, none of the references when taken alone or when taken together suggest or describe the present invention. Stated another way, for the reasons given, a prima facie case of obviousness cannot be supported by references that teach away from the present invention, nor can it be supported without the requisite showing of a motivation to combine the references.

Accordingly, applicants respectfully traverse the rejection of claims 1-13 and 16-18 and courteously solicit the allowance of these claims and passage of the subject application to issue.

Applicants have not calculated a fee to be due in connection with this paper. The Commissioner is hereby authorized to charge Account No. 04-1131 for any deficiency. A duplicate copy of the first page of this transmittal is also included.

Respectfully submitted,

Date 9/2/03

By 

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IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

Group Art Unit 3988
Examiner Edward A. Miller

Graylon K. WILLIAMS, et al. **REPLY BRIEF**

Serial No. 09/664,130

Filed September 18, 2000

For: GAS GENERANTS CONTAINING SILICONE FUELS/ September 2, 2003

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313

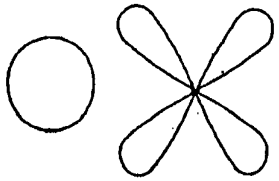
Sir:

Claims 1-13 and 16-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Grebert et al. (3,986,908) in view of Plantif et al. (3,964,256), Hamilton (4,309,229), Ochi et al. (5,656,793), and Taylor et al. (5,538,568). Pursuant to 37 C.F.R. § 1.193(b)(1), Applicants now file a reply brief in response to the Examiner's Answer mailed July 2, 2003.

Grebert et al. teaches compositions containing metal and nonmetal perchlorates and silicone rubbers as organic binders. Grebert does not teach or suggest the use of coolants as presently claimed. Furthermore, as explained in the appeal brief (incorporated herein by reference), Grebert actually teaches away from the addition of other carbon-containing compounds.

Plantif et al recognizes the benefit of forming compositions containing perchlorate oxidizers and silicone resin. Plantif also recognizes the benefit of coolants, but only as coolant stages or phases separate from the combustion stage. Also note that Plantif describes the use of the coolants at temperatures well below the combustion temperature. The second coolant stage is affected by combustion gas contact with a solid particulate coolant comprising a compound which decomposes at a temperature below 200°C to produce a gas. Suitable compounds include alkali metal or alkaline earth metal carbonates, oxalates, or

Exhibit A



INORGANIC REACTIONS AND STRUCTURE

Revised Edition

EDWIN S. GOULD

Stanford Research Institute
(Formerly Polytechnic Institute of Brooklyn)

HOLT, RINEHART AND WINSTON · NEW YORK

To PROFESSOR LINUS PAULING,

one of my early instructors in college chemistry,
who also finds time to do research

Library of Congress Catalog Card Number: 62-9519
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PREFACE TO REVISED EDITION

In the revision of this text, the plan of presentation used in the first edition is, in essence, retained. Major changes, however, have been made in discussions of a number of areas in which recent progress has been most striking. In line with the tremendous increase in interest in inorganic reaction mechanisms, a chapter has been added on that topic; and sections have been added describing electron spin resonance and nuclear magnetic resonance spectroscopy. In discussions of complexes of the transition metals I have used, wherever possible, the ligand-field approach rather than the less powerful valence-bond approach (which, until the early 1950's, was an important part of the structural thinking of inorganic chemists).

As in the first edition, many of the descriptions are brief and non-mathematical in nature. However, the supplementary reading lists at the ends of the chapters, which have been expanded and brought more nearly up to date, contain references to more advanced and rigorous treatments. Some exercises have been changed, some added, a few deleted, and asterisks have been used to mark those which experience has shown to be most challenging to the more capable students. Teachers may obtain answer sheets for exercises in this edition by writing the publisher.

It is a pleasure to thank the members of the Inorganic Chemistry Division at the Polytechnic Institute of Brooklyn and many former students, both graduate and undergraduate, for drawing my attention to errors, both large and small, that appeared in the first edition. I am very much indebted to the Physical and Inorganic Chemistry Section at Stanford Research Institute for support during this revision. My thanks go also to Miss Corlee Lukow for help in preparing the revised manuscript and, once again, to my wife Marjorie for help in countless details.

February, 1962 E. S. G.
Menlo Park, California

ı contact with water for days at room temperature. The alkaline-earth ıetals differ also from the alkali metals in that the lighter members of ıe divalent group can form some complex ions. Although formation of ɔmplex ions of the alkali metals is not completely unknown, it is quite rastically limited, in general to aquo-complex formation.

PREPARATIONS

For many years electrolysis of the fused halides was virtually the only ıethod for obtaining these metals in free state, and it is still very much ıe method of choice for preparing such metals in small quantity. Re-ıntly a number of high temperature reductions have assumed impor-ıance; methods using aluminum for reduction of CaO, coal for the reduc-on of MgO, ferrosilicon alloy for the reduction of MgO, and silicon for :duction of BaO have been developed.

TRENDS WITHIN THE SERIES

Much that has been noted concerning the trends within the alkali-.etal family can be applied also to the alkaline earths. As the radius of ıe atom increases, removal of the outer electrons becomes easier; both ıe ionization potentials for the free atoms and the $E°$ values for the .etals show this:

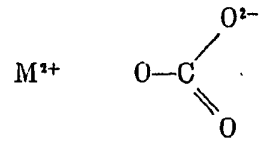
Be: radius 0.9 Å; ionization potential 9.3 volts; $E°$ 1.7 volts
Ba: radius 2.0 Å; ionization potential 5.2 volts; $E°$ 2.9 volts

he values for magnesium, calcium, and strontium lie between those .own for beryllium and for barium. All the trends are continuous; there no anomaly due to hydration energies as was illustrated for lithium. t should be noted once more that ionization potentials and $E°$ values commonly listed describe reducibility from opposite viewpoints; a ıry good reducing agent will have a low value for its IP but a high $E°$ ılue.) The second ionization potentials of the alkaline-earth metals—at is, the energies required to remove the second valence electrons—are ıout twice as great as the first IP's. (For Be, IP_1 = 9.3 volts and IP_2 = 1.2 volts. For Ba, IP_1 = 5.2 volts and IP_2 = 10.0 volts.) Such figures dicate that removal of the second electron is about twice as difficult as moval of the first and suggest that these metals should be univalent ther than divalent. However, the heat of hydration for a divalent ion so much greater than for a univalent ion (Mg, 460 kcal; Na, 97 kcal) at the extra energy released in hydration of the divalent ions more than mpensates for the extra energy necessary to remove the second valence ectrons.

As with the other families, the oxides and salts of the lighter and smaller-sized members are more covalent than those of the heavier and larger-sized members. The contrast between the amphoteric oxide of beryllium and the very basic oxide of barium should be familiar. Let us consider also a trend in the stabilities of the alkaline-earth carbonates, in particular, the temperatures needed to decompose these carbonates at one atmosphere pressure of carbon dioxide:

$BaCO_3$	$SrCO_3$	$CaCO_3$	$MgCO_3$	$BeCO_3$
1360°	1290°	900°	540°	less than 100°

The crystal structures of these solid carbonates are such that it cannot be said that one particular metal ion "belongs" to one particular carbonate ion; nevertheless, a portion of the structure may be represented schematically:



In the most stable carbonates, the interaction between M^{2+} and the nearby oxygen atom of the CO_3^{2-} ion is purely electrostatic; there is comparatively little electron density between the two atoms. As the density of positive charge on M^{2+} increases, the electron cloud on the nearby oxygen becomes distorted toward M^{2+}, the adjoining O—C bond becomes weakened, and the O—M bond becomes strengthened, favoring breakup of the carbonate to the oxide and CO_2. If the positive ion has a very great positive-charge density (Al^{3+}, H^+), the carbonate cannot be made at all.

THE ANOMALY OF BERYLLIUM

As with lithium, many properties of beryllium stand distinctly apart from those of its congeners. Again, the tiny size of the beryllium ion is responsible for the peculiarities. If we arbitrarily call the volume of the magnesium ion 1.0 unit, the volumes of the calcium, strontium, and barium ions become, respectively, about 3, 5, and 8 units; however, the volume of the beryllium ion is, on the same scale, only 1/8 unit. Since the oxide is amphoteric, one would expect many of the salts of Be^{+2} to be extensively hydrolyzed in water (as is the case with the salts of Al^{3+}, Zn^{2+}, and Cr^{3+}). The acidity of beryllium-containing solutions is also increased by polymerization of the beryllium-containing ions:

$$Be(OH_2)_4^{2+} \rightarrow Be(OH_2)_3OH^+ + H^+ \qquad \text{hydrolysis}$$

$$Be(OH_2)_3OH^+ + Be(OH_2)_4^{2+} \rightarrow (H_2O)_3Be—O—Be(H_2O)_3^{2+} + H_3O^+ \qquad \text{dimerization}$$

Beryllium far surpasses its congeners in its ability to form complexes. Besides the stable BeF_4^{2-} ion, beryllium forms many complexes having

Exhibit B

Chemistry of the Elements

N. N. GREENWOOD and A. EARNSHAW

Department of Inorganic and Structural Chemistry
University of Leeds, U.K.

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UK Pergamon Press Ltd, Headington Hill Hall,
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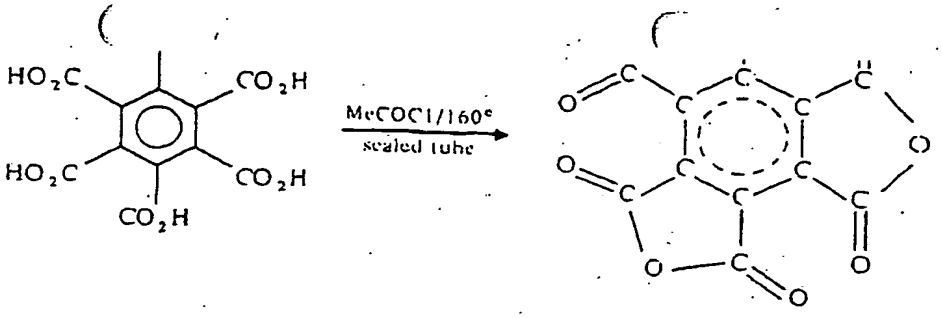

FIG. 8.14

C–O bond confers considerable thermal stability on these molecules but the compounds are also quite reactive chemically, and many of the reactions are of major industrial importance. Some of these are discussed more fully in the Panel.

The nature of the bonding, particularly in CO, has excited much attention because of the unusual coordination number (1) and oxidation state (+2) of carbon: it is discussed on p. 349 in connection with the formation of metal–carbonyl complexes.

Pure CO can be made on a laboratory scale by dehydrating formic acid (HCOOH) with conc H_2SO_4 at ~140°. CO is a colourless, odourless, flammable gas; it has a relatively high toxicity due to its ability to form a complex with haemoglobin that is some 300 times

Industrially Important Reactions of Oxygen and Oxides with Carbon

Carbon monoxide is widely used as a fuel in the form of producer gas or water gas and is also formed during the isolation of many metals from their oxides by reduction with coke. Producer gas is obtained by blowing air through incandescent coke and consists of about 25% CO, 4% CO_2, and 70% N_2, together with traces of H_2, CH_4, and O_2. The reactions occurring during production are:

$$2C + O_2 \longrightarrow 2CO;\quad \Delta H^\circ = -221.0\ \text{kJ/mol } O_2;\quad \Delta S^\circ + 179.4\ \text{J K}^{-1}\ \text{mol}^{-1}$$

$$C + O_2 \longrightarrow CO_2;\quad \Delta H^\circ = -393.5\ \text{kJ mol}^{-1};\quad \Delta S^\circ + 2.89\ \text{J K}^{-1}\ \text{mol}^{-1}$$

Water gas is made by blowing steam through incandescent coke: it consists of about 50% H_2, 40% CO, 5% CO_2, and 5% $N_2 + CH_4$. The oxidation of C by H_2O is strongly endothermic:

$$C + H_2O \longrightarrow CO + H_2;\quad \Delta H^\circ = +131.3\ \text{kJ mol}^{-1};\quad \Delta S^\circ + 133.7\ \text{J K}^{-1}\ \text{mol}^{-1}$$

Consequently, the coke cools down and the steam must be intermittently replaced by a flow of air to reheat the coke.

At high temperatures, particularly in the presence of metal catalysts, CO undergoes reversible disproportionation†

$$2CO \rightleftharpoons C + CO_2;\quad \Delta H^\circ = -172.5\ \text{kJ/mol } CO_2;\quad \Delta S^\circ = -176.5\ \text{J K}^{-1}\ \text{mol}^{-1}$$

† Very recently it has been shown that at all pressures, there is a fairly wide range of temperatures in which CO_2 dissociates directly into CO and O_2 without precipitation of carbon.[11a]

$$CO_2 \rightleftharpoons CO + \tfrac{1}{2}O_2$$

For example, the temperature range is 250–370°C at 10^{-2} atm, 320–480°C at 1 atm, and 405–630°C at 100 atm. At higher temperatures in each case, C is also formed, but always in the presence of some O_2.

[11a] M. H. LIETZKE and C. MULLINS, Thermal decomposition of carbon dioxide, *J. Inorg. Nucl. Chem.* 43, 1769–71 (1981).

Exhibit C

The equilibrium concentration of CO is 10% at 550°C and 99% at 1000°. As the forward reaction involves a reduction in the number of gaseous molecules in the system it is accompanied by a large decrease in entropy. Remembering that $\Delta G = \Delta H - T\Delta S$ this implies that the reverse reaction becomes progressively more favoured at higher temperatures. The thermodynamic data for the formation of CO and CO_2 can be represented diagramatically on an Ellingham diagram (Fig. A) which plots standard free energy changes per mol of O_2 as a function of the absolute temperature.

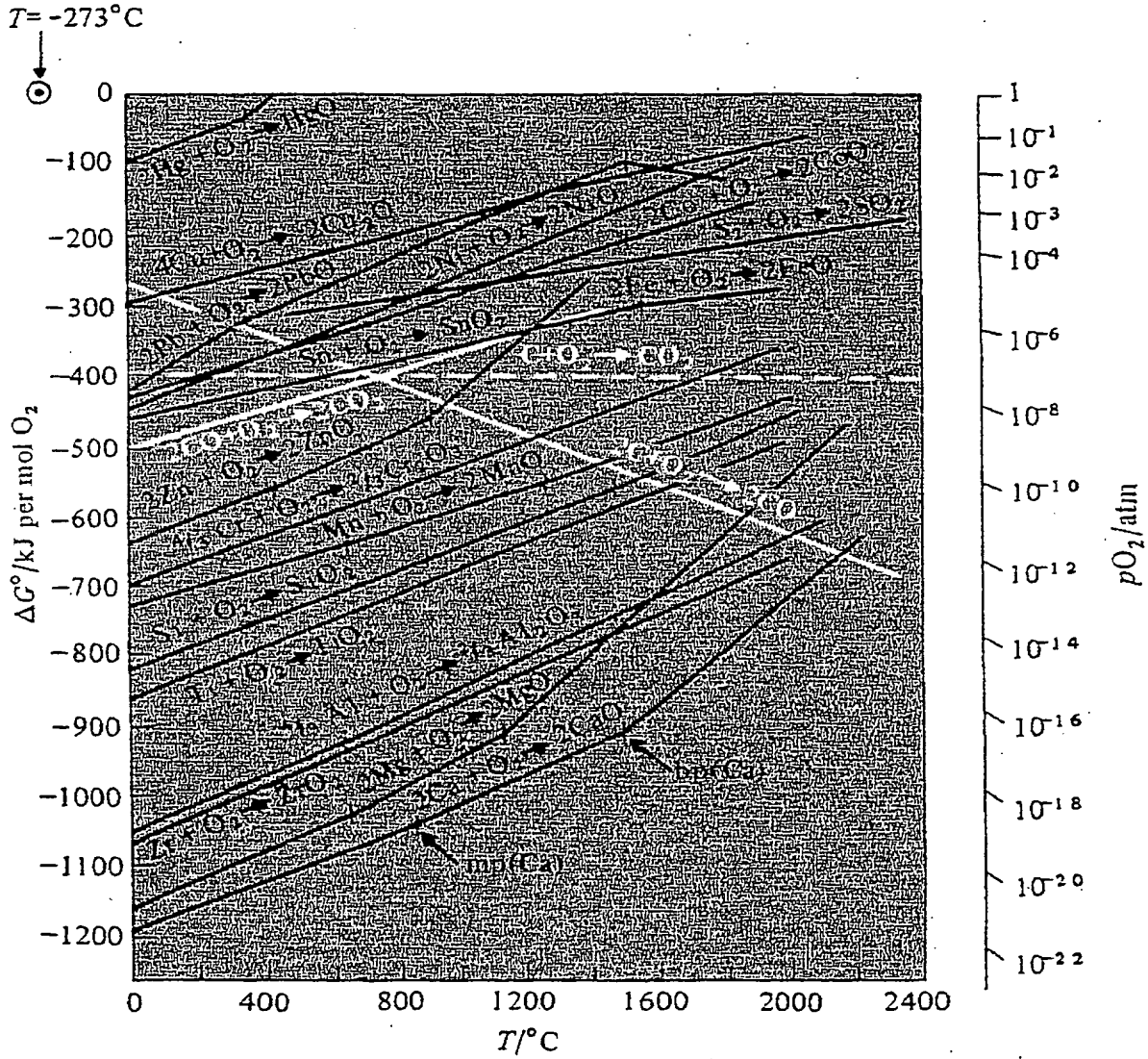

FIG. A Ellingham diagram for the free energy of formation of metallic oxides. (After F. D. Richardson and J. H. E. Jeffes, *J. Iron Steel Inst.* **160**, 261 (1948).) The oxygen dissociation pressure of a given M–MO system at a given temperature is obtained by joining ⊖ on the top left hand to the appropriate point on the M–MO free-energy line, and extrapolating to the scale on the right hand ordinate for p_{O_2} (atm).

The oxidation of C to CO results in an increase in the number of gaseous molecules, it is therefore accompanied by a large increase in entropy and is favoured at high temperature. By contrast, oxidation to CO_2 leaves the number of gaseous molecules unchanged, there is little change in entropy (ΔS° 2.93 J K^{-1} mol^{-1}), and the free energy is almost independent of temperature. The two lines (and that for the oxidation of CO to CO_2) intersect at 983 K, it follows that ΔG for the disproportionation reaction is zero at this temperature. The diagram also includes the plots of ΔG

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Graylon K. Williams, et al			Docket No. 5702-00004
Serial No. 09/664,130	Filing Date September 18, 2000	Examiner Edward A. Miller	Group Art Unit 3641

Invention:

GAS GENERANTS CONTAINING SILICONE FUELS

I hereby certify that the following correspondence:

Request for Oral Hearing Before the Board of Patent Appeals and Interferences; check in the amount of $280.00 and Postcard

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In re Application of: Graylon K. Williams, et al

Application Number: 09/664,130 | Filed: Sept. 18, 2000

For: Gas Generants Containing Silicone Fuels

Art Unit: 3641 | Examiner: Edward A. Miller

Applicant hereby requests an oral hearing before the Board of Patent Appeals and Interferences from in the appeal of the above-identified application.

The fee for this Request for Oral Hearing is (37 CFR 1.17(d)) $ 280.00

☐ Applicant claims small entity status. See 37 CFR 1.27. Therefore, the fee shown above is reduced by half, and the resulting fee is: $ _____

☒ A check in the amount of the fee is enclosed.

☐ Payment by credit card. Form PTO-2038 is attached.

☐ The Director has already been authorized to charge fees in this application to a Deposit Account. I have enclosed a duplicate copy of this sheet.

☒ The Director is hereby authorized to charge any fees which may be required, or credit any overpayment to Deposit Account No. 04-1131 . I have enclosed a duplicate copy of this sheet.

☐ A petition for an extension of time under 37 CFR 1.136(b) (PTO/SB/23) is enclosed. For extensions of time in reexamination proceedings, see 37 CFR 1.550.

WARNING: Information on this form may become public. Credit card information should not be included on this form. Provide credit card information and authorization on PTO-2038.

I am the

☐ applicant/inventor.

☐ assignee of record of the entire interest. See 37 CFR 3.71. Statement under 37 CFR 3.73(b) is enclosed. (Form PTO/SB/96)

☒ attorney or agent of record. Registration number 42,310

☐ attorney or agent acting under 37 CFR 1.34(a). Registration number if acting under 37 CFR 1.34(a). _____

Signature

Laurence C. Begin
Typed or printed name

(248) 364-2100
Telephone number

9/2/03
Date

NOTE: Signatures of all the inventors or assignees of record of the entire interest or their representative(s) are required. Submit multiple forms if more than one signature is required, see below*.

☒ *Total of 1 forms are submitted.

EXHIBIT 4

5702-00004 (GIO-004-US)
Graylon K. Williams, et al
Serial No. 09/664,130 Filed 9/18/2000
FOR: Gas Generants Containing Silicone Fuels

Request for Oral Hearing Before The Board of Patent Appeals and Interferences. (1) Page in duplicate; Reply Brief (23 Pages); Group Art Unit 3641 Examiner Edward A. Miller Check No.18136 for $280.00; By Certificates of Express Mail No. EV 318170480 US on September 2, 2003.

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Dinnin & Dunn, P.C.

EXHIBIT 5

UNITED STATES DEPARTMENT OF COMMERCE
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APPLICATION NO./ CONTROL NO.	FILING DATE	FIRST NAMED INVENTOR / PATENT IN REEXAMINATION	ATTORNEY DOCKET NO.

EXAMINER	
ART UNIT	PAPER
	19

DATE MAILED:

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner for Patents

See the next pages as to appellants' improper Reply Brief and improper IDS.

1. The ostensible reply brief on appeal filed on September 02, 2003 is defective in part because three copies of the brief as required under 37 CFR 1.192(a) have not been submitted.

2. The ostensible reply brief on appeal, Paper No. 17, filed on September 02, 2003 is mainly defective as follows. In accordance with MPEP 1208.03, Paper No. 17 is **NOT** a proper reply brief within the meaning of 37 CFR 1.193(b). Note the following excerpt of section MPEP 1208.03:

> Amendments, affidavits, and/or other evidence must be submitted in papers separate from the reply brief, and the entry of such papers is subject to the provisions of 37 CFR 1.116 and 37 CFR 1.195. **A paper that contains an amendment (or evidence) is not a reply brief within the meaning of 37 CFR 1.193(b).** Such a paper will not be entitled to entry simply because it is characterized as a reply brief. [emphasis added]

Paper No. 17 contains new evidence, in the form of new references. Such raise new issues and are not entitled to entry. No justification as required under 37 CFR 1.116 and 1.195 has been submitted. See also the last paragraph of MPEP 1208.03, re "entry should not be permitted."

3. Therefore, Paper No. 17 is not a reply brief, as characterized, and it stands non-entered. The time period for appellants to file their Reply Brief continues to run 2 months from July 02, 2003. This time period may be extended up to 5 months in accordance with 37 CFR 1.136(a).

4. Any inquiry concerning either this or an earlier communication from the Examiner should be directed to Examiner Edward A. Miller at (703) 306-4163. Examiner Miller may normally be reached Monday-Thursday, from 10 AM to 7 PM.

If attempts to reach Examiner Miller by telephone are unsuccessful, his supervisor Mr. Carone can be reached at (703) 306-4198.

If there is no answer, or for any inquiry of a general nature or relating to the application status, please call the Group receptionist at (703) 308-1113.

Miller/em
September 15, 2003

EDWARD A. MILLER
PRIMARY EXAMINER

The information disclosure statement filed September 8 2003 fails to comply with 37 CFR 1.97(d) because it lacks a statement as specified in 37 CFR 1.97(e) and it lacks the fee set forth in 37 CFR 1.17(p). It has been placed in the application file, but the information referred to therein has not been considered.

It is noted that the statement filed with the IDS alleges that the statement was filed before the mailing of a final action. This is incorrect in that a Final action was mailed in September 2002 whereas the statement was submitted in September 2003.

Any inquiry concerning the denial of acceptance of the IDS should be directed to Michael J Carone at telephone number 703 306-4198.

Michael J Carone
SPE
Art Unit 3641

EXHIBIT 6

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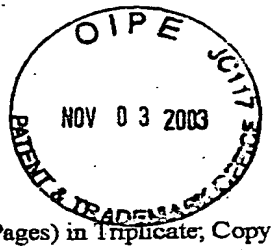

5702-00004 (GIO-004-US)
Graylon K. Williams, et al
Serial No. 09/664,130 Filed 9/18/2000
FOR: Gas Generants Containing Silicone Fuels

Reply Brief and Statement Under 37 C.F.R. 1.195 (14 Pages) in Triplicate; Copy of Exhibit A (4 Pages); Copy of Exhibit B (4 Pages); Copy of Exhibit C (2 Pages) ; Petition for a Two-Month Extension of Time with Check No. 18422 in the amount of $420.00 for fee; By Certificate of Express Mail No. EV 409388685 US Mailed on November 3, 2003.

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Dinnin & Dunn, P.C.

CERTIFICATE OF MAILING BY "EXPRESS MAIL" (37 CFR 1.10) Applicant(s): Graylon K. Williams, et al			Docket No. 5702-00004
Serial No. 09/664,130	Filing Date September 18, 2000	Examiner Edward A. Miller	Group Art Unit 3641

Invention:

GAS GENERANTS CONTAINING SILICONE FUELS

I hereby certify that the following correspondence:

Reply Brief and statement under 37 C.F.R. 1.195 (14 Pages) in Triplicate; Copy of Exhibit A (4 Pages); Copy of Exhibit B (4 Pages); Copy of Exhibit C (2 Pages); Check in the amount of $420.00 for a Two-Month Extension of Time

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IN THE UNITED STATES PATENT
AND TRADEMARK OFFICE

Group Art Unit 3641
Examiner Edward A. Miller

Graylon K. WILLIAMS, et al.

Serial No. 09/664,130

Filed September 18, 2000

For: GAS GENERANTS CONTAINING SILICONE FUELS/

REPLY BRIEF AND STATEMENT UNDER 37 C.F.R. 1.195

November 3, 2003

Mail Stop Appeal Brief-Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313

Sir:

Applicants presented a reply brief responsive to the Examiner's response on September 2, 2003. The Examiner refused to enter the brief stating that the brief had not been supplied in triplicate as required, and that the brief contained "evidence" not earlier submitted in contravention of 37 C.F.R. 1.193(b). See Paper No. 19. The undersigned has contacted Mr. Carone relative to Examiner Miller's concerns in Paper No. 19 and in response, Mr. Carone indicated that if a statement pursuant to 37 C.F.R. 1.195 (of why the "evidence" had not earlier been presented) is included with the reply brief, the reply brief would be entered. Applicants therefore resubmit the reply brief timely filed on September 2, 2003 and concurrently therewith, submit a statement under 37 C.F.R. 1.195 detailing why the exhibits submitted with the reply brief were not earlier presented. At the same time, pursuant to the examiner's comments in Paper No. 19, Applicants petition for a two-month extension for the period of response and include the appropriate fee.

STATEMENT UNDER 37 C.F.R. 1.195

Applicants submit Exhibits A, B, and C responsive to comments *first* made by the examiner in the Examiner's Response to the Appeal Brief, having a mailing date of July 2, 2003. In the examiner's response on page 5, the examiner

responded to the applicants' argument that addition of carbon would increase the amount of carbon monoxide in contravention of Grebert (see applicants' argument on pages 4, 5, and 6 of the Appeal Brief). The applicants did not present the exhibits with the appeal brief because the understanding of how carbon monoxide is formed is so well known (see the Exhibits), that further support of the argument was not believed necessary. Specifically, the examiner stated:

> "...As to carbonate coolant not being desirable in Grebert et al., due to carbon is not persuasive. Plantif et al. teach the use of various [alkali metal and alkaline earth metal] carbonate, oxalate, and bicarbonate coolants at col. 3, lines 23-26. In Hamilton, the coolant is preferably a carbonate, col. 2, lines 26-32. It must be observed that the carbon in a metal carbonate decomposes to form metal oxide and carbon dioxide. In other words, **appellants' objection to adding carbon lacks scientific foundation, as the carbon of the coolant is already oxidized,** or mostly so in the case of oxalate..."(emphasis added)

The examiner had not prior to the Examiner's Response Brief raised this argument and therefore the applicants only presented **known textual material** that would rebut the examiner's argument. The examiner's argument had not been earlier made and therefore the applicants reasonably and timely responded to rebut the examiner's argument in the Reply Brief. The exhibits do not consist of added technical data relative to the application but simply rebut the examiner's arguments quoted above. Denial of entry of the Reply Brief on the basis of inclusion of textual exhibits known in the art would deny the applicants a full prosecutorial opportunity to respond to arguments not earlier presented by the examiner.

Accordingly, the applicants courteously solicit entry of the reply brief with the exhibits given that a showing of good and sufficient reason for the earlier presentation of the exhibits has been shown.

REPLY BRIEF

Claims 1-13 and 16-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Grebert et al. (3,986,908) in view of Plantif et al. (3,964,256), Hamilton (4,309,229), Ochi et al. (5,656,793), and Taylor et al. (5,538,568). Pursuant to 37 C.F.R. § 1.193(b)(1), Applicants now again file a reply brief in

response to the Examiner's Answer mailed July 2, 2003.

Grebert et al. teaches compositions containing metal and nonmetal perchlorates and silicone rubbers as organic binders. Grebert does not teach or suggest the use of coolants as presently claimed. Furthermore, as explained in the appeal brief (incorporated herein by reference), Grebert actually teaches away from the addition of other carbon-containing compounds.

Plantif et al recognizes the benefit of forming compositions containing perchlorate oxidizers and silicone resin. Plantif also recognizes the benefit of coolants, but only as coolant stages or phases separate from the combustion stage. Also note that Plantif describes the use of the coolants at temperatures well below the combustion temperature. The second coolant stage is affected by combustion gas contact with a solid particulate coolant comprising a compound which decomposes at a temperature below 200°C to produce a gas. Suitable compounds include alkali metal or alkaline earth metal carbonates, oxalates, or bicarbonates. See column 3, lines 20-35. As such, Plantif incorporates outboard coolants as recognized by the Examiner, but does not contemplate or suggest the use of a coolant integral to the gas generant composition that is then combusted at much higher temperatures. Accordingly, even though cooling the combustion gases is recognized as a problem, there simply is no suggestion by Plantif to integrate the coolant into the gas generant composition to accomplish cooling of the combustion gases. Therefore, when reviewing Plantif one of ordinary skill in the art would not be motivated to completely change the invention of Plantif to add the coolants into the gas generant composition rather than cool in stages subsequent to the combustion stage.

Hamilton teaches away from the present invention. At column 1, lines 45-50, Hamilton summarizes the invention:

> In accordance with the present invention, a combustible mixture of carbon, an oxidizer which does not contain hydrogen and, optionally, a coolant are mixed to form a combustible material which produces non-toxic gas rapidly, at relatively low temperature, and

without the production of water vapor. (Emphasis added)

Silicone, as described in Formulas 1 and 2 of the present invention, for example, often contains an abundant amount of hydrogen. This contravenes Hamilton because of the propensity for compositions containing silicone to produce at least minimal amounts of water. In fact, **Grebert** at column 5, lines 26-40, describes the same. Accordingly, when a reference teaches away from an invention it cannot suggest the same. Stated another way, one of ordinary skill in the art would not be motivated to include silicone in a gas generant composition in light of Hamilton because Hamilton specifically teaches against compositions that result in the formation of water vapor.

Ochi et al. does not suggest any fuel (or reducing agent) other than HDCA or hydrazodicarbonamide. The structure of HDCA is markedly different from silicone. Hence Ochi does not suggest the use of silicone by virtue of the use of HDCA. Compare Formula 1 of Ochi with Formulas 1 and 2 of the present invention. The examiner's attention is also directed to Tables 2, 5, and 6 as found in Ochi. The "In-tank gas temperature (°C)" resulting from combustion of compositions described by Ochi ranges from 152 to 407 °C. When viewed in light of Ochi's objects of the invention as described in column 2, lines 5-35 (e.g. low combustion temperature), one of ordinary skill in the art would not be motivated to replace the low heat generating HDCA with silicone. Nor would one of ordinary skill in the art be motivated to add silicone to the compositions of Ochi. Adding silicone would increase the temperature in contravention of the stated purpose of maintaining low temperatures. The use of silicone results in temperatures in excess of 2000°C as given in Table 1 on pages 6 and 7 of the specification. Therefore, Ochi et al. also **teaches away** from the present invention.

Although **Taylor** describes the use of perchlorates in compositions, the similarity ends there. As with the other cited references, Taylor does not offer any motivation or suggest formulation of the present compositions when viewed in light of Grebert. Taylor has as an object of the invention production of an easily

extrudable composition that is readily cured at room temperature, and mixed at low viscosity. See the "Summary of the Invention". These objects simply differ from the benefits characterized in the present invention. As such, one of ordinary skill in the art would not be motivated to consider Taylor when formulating the present compositions. A prima facie case of obviousness cannot be supported without the requisite showing of a suggestion or motivation to combine the references. Again, as with the other references mentioned above, Taylor falls short in this regard.

In view of the above, Applicants note that it is improper to combine references where the references teach away from their combination. ***In re Grasselli,*** 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983) (The claimed catalyst which contained both iron and an alkali metal was not suggested by the combination of a reference which taught the interchangeability of antimony and alkali metal with the same beneficial result, combined with a reference excluding antimony from, and adding iron to, a catalyst.)

Response to Examiner's Arguments

In addition to the comments above, Applicants note the following relative to the Examiner's response to the Applicants' arguments presented in the appeal brief.

To begin with, the Examiner throughout refers to the variation of the specific type and amount of coolant as well as "**other notoriously well known** ingredients, for example, within the parameters taught, to obtain a suitable cooling result, would have been obvious to the person of ordinary skill in the art." See page 4, lines 5-6 of the Examiner's Response. In the same way, the Examiner again refers to coolants as "a **notoriously well known** variable that one of ordinary skill in the art may apply as desired". See page 6, lines 12-13 of the Examiner's Response. Other occurrences of the same or similar language are also noted. For

example, on page 6, lines16-17, "**all as is notoriously well known to one of ordinary skill in the art.**"

The Examiner is respectfully advised that, "a statement that modifications of the prior art to meet the claimed invention '*would have been well within the ordinary skill of the art at the time the invention was made*' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teaching of the references." *Ex parte Levengood* 28 USPQ 2d 1300 (Bd. Pat. App. & Inter. 1993) See also *In re Kotzab* 217 F. 3d 1365, 1371, 55 USPQ 2d 1313, 1318 (Fed. Cir. 2000)

Furthermore, the Examiner is also advised that, "the question under 35 U.S.C. § 103 is not whether the **differences** [between the claimed invention and the prior art] would have been obvious" but "whether the claimed invention ***as a whole*** would have been obvious." *Stratoflex, Inc. v. Aeroquip Corp.*, 713 F.2d 1530, 1537, 218 USPQ 871, 877 (Fed. Cir. 1983) Accordingly, Applicants respectfully note that the Examiner's emphasis on addition and variation of the coolant is misplaced. Rather, proper emphasis is placed on the compositions as a whole and how the references taken as a whole suggest to one of ordinary skill in the art their respective combination to form the compositions as claimed in the present application.

In the same way, see page 6, lines 17-18 of the Examiner's Response, "Further, although in some instances as in Hamilton, water vapor may not be desired, this is also **an art recognized choice to the ordinarily skilled artisan.**" The case law cited above is also pertinent here. Furthermore, the Examiner fails to appreciate that Hamilton must be viewed *as a whole* as should any other reference when applied under 35 U.S.C. 103. When viewed as a whole, it becomes apparent that Hamilton would not lead one of ordinary skill to combine the teachings of Hamilton with Grebert, for as discussed herein and in the Appeal Brief, each cited reference explicitly and/or implicitly teaches away from the

combination with the other. The Examiner states on page 4, lines 16-17 that "it is respectfully pointed out that it is the teachings of the prior art that are combined for what they teach, not the prior art per se." Applicants respectfully point out that it is the prior art, not the individual teachings, that provide the basis for the rejection under 35 U.S.C. 103. Accordingly, the Examiner is advised that the prior art references must be considered in their entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.,* 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied,* 469 U.S. 851 (1984)

Accordingly, Applicants respectfully maintain that when the references are considered in their entirety rather than as individual teachings in the art as apparently urged by the Examiner, the impropriety of combining the references becomes apparent for the reasons stated by the Applicants in the Appeal Brief and throughout this response. Furthermore, Applicants maintain that the compositions incorporating coolants as claimed do not represent **"notoriously well known"** variables or constituents known for their use in silicone based compositions, or in gas generators and combusted therein. The cited references certainly would not lead to that conclusion. Further references are still requested. Applicants would direct the Examiner's attention to the arguments based on insufficient motivation to combine the cited references and also on how the various references actually teach away from their respective combination, particularly Grebert et al.

As to the arguments presented regarding the **"comprising"** scope, any distinctions made relative to the compositions described in the various references are not made to suggest what is not included in the present claims, but rather to emphasize what is not taught or motivated in the respective reference. Applicants appreciate the Examiner's remarks relative to the "comprising" scope in the claims and understand the term to be broad-based relative to the scope. Applicants also understand the term to mean that the named elements are essential, but other elements may be added and still form a construct within the scope of the claim. *Moleculon Research Corp. v. CBS, Inc.,* 793 F.2d 1261, 229 USPQ 805 (Fed. Cir.

1986); *In re Baxter,* 656 F.2d 679, 686, 210 USPQ 795, 803 (CCPA 1981)

Grebert et al. – Insufficient Motivation to Combine

As to the argument at the top of the Examiner's Response on page 5, Grebert et al. does teach that the gases should be non-toxic. Grebert also teaches that the compositions described must exhibit enhanced mechanical properties or mechanical strength. Accordingly, Grebert's compositions are directed at propellant compositions that have good mechanical strength and that yield combustion gases which are substantially free of toxic gases and which are, therefore, suitable for use as gas generators for inflatable cushion protection devices. See Grebert at column 1, lines 22- 35. As recognized by the Examiner, Applicants agree that non-toxicity is of course a concern with all gas generants involving human exposure. Nevertheless, in contradistinction to Grebert et al., the problems addressed by the present invention are centered about providing a gas generant composition having a sustained burn at ambient pressure while exhibiting relatively reduced temperatures. See the Background of the Invention and see Table 1 and the Examples in the present application. Because Grebert et al. describes a different purpose for different compositions, Applicants maintain that one of ordinary skill in the art would not be motivated to combine Grebert et al. with Plantif, Hamilton, Taylor, or Ochi, because as explained above, the purposes for Grebert depart from the purposes of the present invention. Stated another way, Applicants are primarily concerned with sustained combustion at ambient pressures with relatively lower temperatures. On the other hand, Grebert is primarily concerned with non-toxicity and higher mechanical strength.

In support thereof, Applicants respectfully note that, "there are three possible sources for a motivation to combine references: <u>the nature of the problem to be solved,</u> the teachings of the prior art, and the knowledge of persons of ordinary skill in the art." *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457-58 (Fed. Cir. 1998) (The combination of the references taught every

element of the claimed invention, however, without a motivation to combine, a rejection based on a *prima facie* case of obvious was held improper.) The level of skill in the art cannot be relied upon to provide the suggestion to combine references. *Al-Site Corp. v. VSI Int'l Inc.*, 174 F.3d 1308, 50 USPQ2d 1161 (Fed. Cir. 1999) Applicants note that the Examiner has not shown the requisite motivation or suggestion to combine Grebert et al. with the other cited references as required to support a *prima facie* case of obviousness.

Grebert et al. – Teaching Away

With regard to **Grebert et al.** teaching away from combination with any other carbon-containing constituents, Applicants reiterate the discussion found in the Appeal Brief, herein incorporated by reference. Furthermore, Applicants acknowledge the Examiner's argument that the carbon in a metal carbonate decomposes to form metal oxide and carbon dioxide. The Examiner further states that appellants' objection to adding carbon lacks scientific foundation as the carbon of the coolant is already oxidized, or mostly so in the case of oxalate. Responsive thereto, Applicants respectfully maintain that it is well known in the art that carbon dioxide and carbon monoxide exist in equilibrium across a broad spectrum of pressures and temperatures. As such, addition of a coolant that decomposes to carbon dioxide (among other things) and would result in increased amounts of carbon monoxide in the combustion products. In support thereof, Applicants direct the Examiner's attention to **Exhibits A, B, and C.**

Exhibit A is a copy of an excerpt from *INORGANIC REACTIONS AND STRUCTURE*, Edwin S. Gould (1955, 1962) Holt, Rinehart and Winston, Inc. As shown on page 107, the decomposition of various alkaline earth carbonates occurs at different respective temperatures, or, the decomposition temperature of a carbonate differs with the alkaline earth metal (or metal) attached thereto.

Exhibit B is a copy of an excerpt from *Chemistry of the Elements*, N.N. Greenwood and A. Earnshaw (1984) Pergamon Press Ltd. As described in the

highlighted portions originally taken from the *J. Inorg. Nucl. Chem.* 1769-71 (1981),

> "Very recently it has been shown that, at all pressures, there is a fairly wide range of temperatures in which CO_2 dissociates directly into CO and O_2 without precipitation of carbon.
>
> $CO_2 \quad CO + \frac{1}{2}O_2$ "

As shown, CO and CO_2 exist in equilibrium in a broad variety of pressure/temperature permutations.

Exhibit C is a copy of an excerpt from *J. Iron Steel Inst.* , F.D. Richardson and J.H.E. Jeffes 160, 261 (1948). Note that,

> "The equilibrium concentration of CO is 10% at 550°C and 99% at 1000°C.."

As shown, CO exists in equilibrium in greater percentages at higher temperatures.

It can therefore be concluded that at the temperatures indicated in Table 1, well above 1000°C, equilibrium conditions at the temperatures indicated would favor the formation of carbon monoxide. Accordingly, it can be concluded that the addition of metal carbonates and/or oxalates that result in carbon dioxide also result in a certain equilibrium concentration of carbon monoxide depending on the attendant temperature and pressure.

As such, the Examiner's assertion that the Appellants' position (*that the addition of a coolant such as a carbonate or oxalate adds carbon monoxide to the combustion gases*) is scientifically unfounded is respectfully traversed, especially in view of the textual references provided. Accordingly, Applicants again maintain that **Grebert et al.** teaches away from adding compounds or constituents that would increase the carbon monoxide because of the equilibrium conditions shown.

As to other arguments presented by the Examiner, Applicants note the following:

1. Contrary to the Examiner's assertion, Plantif et al. does not teach that the SNPE silicone gas generating composition may generate excess oxygen at column 2, lines 23-27. For the sake of argument only, even if the Examiner had shown this teaching to be the case, and even if the suggestion to combine Plantif with Grebert had been shown, Grebert describes the addition of aluminum. It is well known that aluminum scavenges the available oxygen to form aluminates thereby reducing the availability of oxygen for complete combustion of carbon monoxide. Again, this is illustrated in the table found in Grebert in column 4, lines 37-45.

2. The Examiner asserts that *"the problem Grebert et al. discusses is, obviously a translation difficulty from the French, is not any additive that is carbon containing, but an additive that is contained in the composition and is elemental carbon."* The Examiner's attention is directed to Grebert et al., **column 4 line 14-column 5 line 15**. In contrast to what the Examiner urges, note that Grebert teaches that the addition of a binder should be reduced to reduce the production of carbon monoxide. He does not focus on elemental carbon but on carbon-containing binders (e.g. silicone). Applicants note that this same admonition would be applicable to any carbon-containing compound likely to produce carbon monoxide. The notion that this is a translational error would require that the same translational difficulty occur throughout the reference. Applicants still do not understand how the Examiner concludes that the problem is limited to elemental carbon. It plainly is not, **as taught by Grebert et al.**

3. The Examiner alludes to the breadth of the present claims with

regard to the small amounts of aluminum fuel and carbon combustion catalysts. Applicants respectfully maintain that the proper focus is placed on the motivation of one of ordinary skill in the art to combine the cited references. It is only placed on the claims with regard to the essential limitations described therein. It is unclear why the Examiner focuses on the breadth of the claims instead of on the motivation of one of ordinary skill in the art to combine the references to form a prima facie case of obviousness. The Examiner has not shown why one of ordinary skill in the art would combine the references to formulate the essential elements of the claims as presently given. In essence, a prima facie case of obviousness is not predicated on the breadth of the claims and what they might include. Rather, a prima facie case of obviousness is supported by references ***properly combined*** that teach or describe all of the essential limitations of the claims. Accordingly, Applicants continue to maintain that for the reasons stated, a prima facie case of obviousness is simply not supported.

4. Applicants note the Examiner's instruction relative to Ochi and various facts about coolants: "*These are not opinion, they are facts. Coolants cool endothermically; that is a matter of plain chemistry.*" Applicants agree. See page 2, lines 23-26 of the Appeal Brief, for example. Also, the Examiner states, "*Among the variables are the metals and construction of the gas generating apparatus, as well as the presence or absence and the length of ducts, and variation in the materials of the air bag itself.*" Applicants respectfully note that these "variables" are not implicated in the claims. Rather, unique compositions incorporating a coolant are claimed by the Applicants. These are not notoriously well known or Plantif et al, for example, would certainly have alluded to their use within a composition rather than to the use of outboard coolants as taught therein.

5. With regard to Ochi et al., Applicants note that Ochi describes the use of coolants, but not within compositions containing silicone and perchlorate oxidizers. In fact, none of the references describe coolants used within a composition containing silicone and a perchlorate oxidizer. Furthermore, because of different purposes or because of teaching away, the Examiner has not shown any motivation to combine the references. The Examiner is reminded that, "a statement that modifications of the prior art to meet the claimed invention '*would have been well within the ordinary skill of the art at the time the invention was made*' because the references relied upon teach that all aspects of the claimed invention were individually known in the art is not sufficient to establish a prima facie case of obviousness without some objective reason to combine the teaching of the references." *Ex parte Levengood* 28 USPQ 2d 1300 (Bd. Pat. App. & Inter. 1993) See also *In re Kotzab* 217 F. 3d 1365, 1371, 55 USPQ 2d 1313, 1318 (Fed. Cir. 2000)

Therefore, since none of the prior art of record teaches Applicants' claimed invention, nor provides any reason or motivation to modify the prior art to solve the specific problems for which Applicants were concerned, Applicants' position is that the Examiner has improperly relied upon Applicants' own teachings to support the grounds of rejection. See *In re Regel,* 526 F. 2d 1399, 1403 n.6, 188 USPQ 136, 139 n. 6 (CCPA 1975) ("there must be some logical reason apparent from positive, concrete evidence of record which justifies a combination of primary and secondary references") (citing *In re Stemniski*, 444 F.2d 581, 170 USPQ 343 (CCPA 1971)); *In re Geiger*, 815 F.2d 686, 688 2 USPQ2d 1276, 1278 (Fed. Cir. 1987) (obviousness cannot be established by combining pieces of prior art absent some "teaching, suggestion, or incentive supporting the combination"); *In re Cho*, 813 F.2d 378, 382, 1 USPQ2d 1662, 1664 (Fed. Cir. 1987) (discussing

the Board's holding that "the artisan would have been motivated" to combine the references); *In re Deminski*, 796 F.2d 436, 443, 230 USPQ 313, 316 (Fed. Cir. 1986) (impropriety of hindsight reconstruction); and *In re Donohue*, 766 F.2d 531, 534, 226 USPQ 619, 622 (Fed. Cir. 1985) (referring to the "suggestion or motivation to combine teachings" in rejections for obviousness) (citing *In re Samour,* 571 F.2d 559, 563, 197 USPQ 1, 4-5 (CCPA 1978). As such, the Examiner has failed to properly set forth a prima facie case of obviousness.

In sum, none of the references when taken alone or when taken together suggest or describe the present invention. Stated another way, for the reasons given, a prima facie case of obviousness cannot be supported by references that teach away from the present invention, nor can it be supported without the requisite showing of a motivation to combine the references.

Accordingly, applicants respectfully traverse the rejection of claims 1-13 and 16-18 and courteously solicit the allowance of these claims and passage of the subject application to issue.

Applicants have calculated a fee of $420.00 to be due in connection with this paper and our check in that amount is enclosed. The Commissioner is hereby authorized to charge Account No. 04-1131 for any deficiency or credit any overage to the same account. A duplicate copy of the first page of this transmittal is also included.

Respectfully submitted,

Date 11/3/03

By _____

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EXHIBIT 7

Communication Re: Appeal	Application No. 09/664,130	Applicant(s) WILLIAMS ET AL.
	Examiner Edward A. Miller	Art Unit 3641

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

1. ☐ The Notice of Appeal filed on _____ is not acceptable because:

   (a) ☐ it was not timely filed.

   (b) ☐ the statutory fee for filing the appeal was not submitted. See 37 CFR 1.17(b).

   (c) ☐ the appeal fee received on _____ was not timely filed.

   (d) ☐ the submitted fee of $_____ is insufficient. The appeal fee required by 37 CFR 1.17(b) is $_____.

   (e) ☐ the appeal is not in compliance with 37 CFR 1.191 in that there is no record of a second or a final rejection in this application.

   (f) ☐ a Notice of Allowability, PTO-37, was mailed by the Office on _____.

Reply

2. ☒ The ~~appeal~~ brief filed on *03 November 2003* is NOT acceptable for the reason(s) indicated below:

   (a) ☒ the brief ~~and/or brief fee~~ is untimely. See 37 CFR 1.192.

   (b) ☐ the statutory fee for filing the brief has not been submitted. See 37 CFR 1.17(c).

   (c) ☐ the submitted brief fee of $_____ is insufficient. The brief fee required by 37 CFR 1.17(c) is $_____.

~~The appeal in this application will be dismissed unless corrective action is taken to timely submit the brief and requisite fee. Extensions of time may be obtained under 37 CFR 1.136(a).~~

See next page.

3. ☐ The appeal in this application is DISMISSED because:

   (a) ☐ the statutory fee for filing the brief as required under 37 CFR 1.17(c) was not timely submitted and the period for obtaining an extension of time to file the brief under 37 CFR 1.136 has expired.

   (b) ☐ the brief was not timely filed and the period for obtaining an extension of time to file the brief under 37 CFR 1.136 has expired.

   (c) ☐ Request for Continued Examination (RCE) under 37 CFR 1.114 was filed on _____.

   (d) ☐ other: _____

4. ☐ Because of the dismissal of the appeal, this application:

   (a) ☐ is abandoned because there are no allowed claims.

   (b) ☐ is before the examiner for final disposition because it contains allowed claims. Prosecution on the merits remains CLOSED.

   (c) ☐ is before the examiner for consideration of the submission and prosecution has been reopened pursuant to 37 CFR 1.114.

1. The reply brief filed on November 11, 2003 is unacceptable because it was filed after the expiration of the time for reply.

2. Note 37 CFR 1.193 and 1.136, each in pertinent part [emphasis added]:

§ 1.193 Examiner's answer and reply brief.

...

(b) (1) Appellant may file a reply brief to an examiner's answer or a supplemental examiner's answer within two months from the date of such examiner's answer or supplemental examiner's answer. **See § 1.136(b) for extensions of time for filing a reply brief** in a patent application and § 1.550(c) for extensions of time for filing a reply brief in a reexamination proceeding. ...

§ 1.136 Extensions of time.

(a) (1) If an applicant is required to reply within a nonstatutory or shortened statutory time period, applicant may extend the time period for reply up to the earlier of the expiration of any maximum period set by statute or five months after the time period set for reply, if a petition for an extension of time and the fee set in § 1.17(a) are filed, unless:

(i) Applicant is notified otherwise in an Office action;

(ii) The reply is a reply brief submitted pursuant to § 1.193(b);

(iii) The reply is a request for an oral hearing submitted pursuant to § 1.194(b);

(iv) The reply is to a decision by the Board of Patent Appeals and Interferences pursuant to § 1.196, § 1.197 or § 1.304; or

...

(b) When a reply cannot be filed within the time period set for such reply and the provisions of paragraph (a) of this section are not available, the period for reply will be extended only for sufficient cause and for a reasonable time specified. **Any request for an extension of time under this paragraph must be filed on or before the day on which such reply is due**, but the mere filing of such a request will not affect any extension under this paragraph. In no situation can any extension carry the date on which reply is due beyond the maximum time period set by statute. ...

The time for filing a reply brief has expired and neither parts (a) nor (b) or 37 CFR 1.136 are applicable at this time. Neither the reply brief filed November 11, 2003 nor the reply brief filed September 2, 2003 have been entered. Since this application is ready for decision, it will be forwarded to the Honorable Board of Patent Appeals and Interferences therefore. Further, since the Reply Brief is not entitled to entry as untimely, the Examiner will not discuss why applicants arguments of a new issue in the Examiner's Answer are defective, or in error.

3. The information disclosure statement filed November 8, 2003 fails to comply with 37 CFR 1.97(d) because it lacks the fee set forth in 37 CFR 1.17(p). It has been placed in the application file, but the information referred to therein has not been considered.

4. The information disclosure statement filed November 8, 2003 fails to comply with 37 CFR 1.97(d) because it lacks a statement as specified in 37 CFR 1.97(e). It has been placed in the file, but the information referred to therein has not been considered. See 37 CFR 1.97(e):

(e) A statement under this section must state either:
(1) That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or
(2) That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in § 1.56(c) more than three months prior to the filing of the information disclosure statement.

The original statement filed September 8, 2003, refers to filing the IDS before the "mailing date of a final rejection." Obviously, a date after the Appeal Brief and Examiner's Answer is not "prior to a final rejection." The reliance on 1.97(c) in said statement is obviously defective.

5. Any inquiry concerning either this or an earlier communication from the Examiner should be directed to Examiner Edward A. Miller at (703) 306-4163. Examiner Miller may normally be reached Monday-Thursday, from 10 AM to 7 PM.

If attempts to reach Examiner Miller by telephone are unsuccessful, his supervisor Mr. Carone can be reached at (703) 306-4198.

If there is no answer, or for any inquiry of a general nature or relating to the application status, please call the Group receptionist at (703) 308-1113.

Miller/em
December 2, 2003

EDWARD A. MILLER
PRIMARY EXAMINER

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